

On Yijing, Chinese Traditional Divination and Their Possible Connection to Formal Logic

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Abstract. The works of Logic and Yijing are widely recognized as seminal texts in the realms of Western and Eastern philosophy, respectively. The application of processing human-generated language and events involves a set of comparable procedures. This study postulates the existence of shared domains between the two bodies of knowledge. The author acknowledges a proposal put up by a student, which centers on the interrelationships between two bodies of information. The author delves into the potential for these two knowledge domains to reinforce one another and enhance comprehension via a cross-cultural lens. The empirical research conducted an investigation on three instances when individuals used divination methods based on Yijing. The study employed first-order logic as a means to reassess the accuracy of the outcomes obtained via these divination practices. Symbolization using first-order logic and the computation of entailment are used in the field of data analysis. According to the findings, a significant majority of the instances demonstrated logical validity. Furthermore, the examination of these examples included the exploration of concepts such as uncertainty, a contradiction in mental behavior, and the impact of social ties on the implications of factual information. These two areas of knowledge were interconnected in the analysis and discussion. It is recommended that further research be conducted on cross-paradigm epistemology.

Keywords: First-Order Logic; Yijing; Divination.

1. Introduction

The Yijing (I Ching) and formal logic, treasures of Eastern and Western philosophy respectively, trace their origins to around 1000-500 BC and have evolved through generations. As a student studying both disciplines, the author noticed their potential for comparability and mutual transferability when applied to human activities. Specifically, both processes—the processes of divination based on the Yijing and argumentation using formal logic share many common principles [1, 2]. They both symbolize human-involved events and languages, employ fixed inferences and computation processes, and yield sole outcomes within defined contexts. However, their application processes differ. As for logic, the computation process is transparent. The knowledge of logic is developed and tested in a manner understandable by human reason, resulting in a consensus on outcomes. In contrast, the processes of divination based on the Yijing employs coincidence. It relies on the 'Innate Bagua Diagram', a model dating back to 1000 BC [3]. Users are tolerated to obtain individualized understanding and interpretation toward it.

Furthermore, the two disciplines carry different reputations and elicit distinct attitudes from users. To explain, logic is widely used as a tool in fields such as philosophy of language, computer science, etc., representing supreme rational and making significant contributions to the scrutiny of human thought [4]. On the other hand, divination based on Yijing is regarded as a role of influencing human mood and mindset when making judgments and decisions. Users show unexpectancy toward results until they see factual validation of the sole outcomes. Divination has been based on the Yijing falls under the realm of mysticism, rejected by rationality, or studied as a human behavior within anthropology.

There are behaviors of excluding all phenomena that cannot be explained by known human rationality from rationality. This study chooses otherwise. The validity of divination based on the Yijing cannot be explained by current human rationality and cognition, but this does not equate to it being irrational. The author employs the method of first-order logic for truth-value computation in

this research, testing the validity of divination based on the Yijing from a rational perspective. The research proposing the hypothesis of comparability and transferability exists between first-order logic computation and divination based on the Yijing. The study aims to provide further suggestions when finding the rationale behind the Yijing. The article utilizes case studies, consisting of three narrations by three divination recipients. First-order logic will be used to analyze the data, including symbols and calculating the languages in the narrations. Then, the result of the first-order logic and the divination based on Yijing will be compared, with the referring of facts.

2. The logic of decision-making science and Yijing's divination

Formal logic is a tool for analyzing and studying the formal structure of propositions, arguments, and reasoning, without involving their content. First-order logic is a type of formal logic. It introduces concepts such as predicates, quantifiers, and variables, allowing us to express and analyze statements about objects, properties, and relationships more precisely. By using first-order logic, we can symbolize, calculate for validity, interpret, and reason about various complex real-world scenarios. This article utilizes first-order logic as a tool to re-calculate the case studies provided by the divination recipients.

The Yijing, also known as the Book of Changes, stands as a classical Chinese philosophical tome that is divided into twelve main sections:

To commence, the venerable Senior Fuxi ingeniously conceived eight elemental hexagrams, denoted as gua, each constituted by three lines, yao. These lines can assume either a continuous form (representing 'yin') or a divided form (symbolizing 'yang'). The permutations and transformations inherent in these foundational eight hexagrams give rise to a comprehensive array of sixty-four hexagram combinations. Subsequently, King Wen of Zhou meticulously transcribed interpretative narratives for the sixty-four hexagrams and their constituent 384 lines.

Furthermore, Confucius made a substantial contribution by appending ten supplementary treatises to elucidate and enhance comprehension for those who sought enlightenment through this text. These additional articles encompass an explanation of the eight foundational hexagrams by Confucius, denoted as Shuo Gua. Additionally, they include story-based elucidations, named Xi Ci, offering epistemic insights into the sixty-four hexagrams (comprising two articles). Moreover, they feature extensions of the initial two hexagrams, labeled Wen Yan, amplifications of King Wen's interpretations termed 'Xiang Zhuan' (comprising two articles), an exposition on the rationale behind the sequence of the sixty-four hexagrams, known as Xu Gua, an exploration into the factors that enable hexagrams to symbolize corresponding concepts referred to as 'Tuan Zhuan' (comprising two articles), and an inquiry into diverse interpretations of select hexagrams denominated as Za Gua [5].

Collectively, these twelve sections constitute the original Yijing text, a subject of enduring scholarly inquiry throughout history. It is noteworthy that Confucius's ten supplemental articles for the Yijing have occasionally attracted criticism for introducing a Confucian perspective into the original Yijing text. In this case, the versions attributed to Fuxi and King Wen are regarded by some as more faithful to their presumed original form.

As previously elucidated, Yijing-based divination hinges upon the principle of contingency. Specifically, individuals initially acquire hexagrams and their corresponding lines (yao) through serendipitous means, serving as symbolic representations of the events in question. Subsequently, the process involves inferential reasoning grounded in these symbols, encompassing the explication of hexagrams, the scrutiny of line placements within them, the analysis of inter-line relationships, and the consideration of changing lines (whereby an initially obtained hexagram can transmute into a new configuration through modifications to its constituent lines).

Carl Gustav Jung introduced the concept of synchronicity, which he denominated as meaningful coincidence [6]. This concept embodies several salient facets. First and foremost, synchronicity denotes the existence of meaningful linkages between events that elude conventional causal explication; it transcends the paradigm of causality. Secondly, synchronous events bear import and

significance for the individuals experiencing them, frequently involving symbols, archetypes, or themes pertinent to the individual. Thirdly, it blurs the demarcations between an individual's internal psychological realm and the external physical world, thus engendering the potential for interconnectedness. Lastly, synchronicity represents a subjective encounter, signifying that it carries significance for the person undergoing it. What may appear as a meaningful coincidence to one individual may not hold a commensurate import for another. In extant research concerning divination based on Yijing, the concept of synchronicity has been enlisted to expound upon the notion of contingency.

The study initially revolves around examining the comparability and transferability between first-order logic operations and divination based on the Yijing. However, adjustment is happening as the inquiry continues. Details are reported below.

Initially, the words of comparability and transferability pertain to the similarities in cognitive processes and the potential for shared learning approaches when learning these two distinct knowledge domains. For example, both domains may encompass certain overlapping knowledge elements, such as the fundamental concept of binary. However, a comprehensive review of existing literature reveals that, as of yet, these two forms of knowledge have not been concurrently explored or integrated into scholarly discourse.

This observation leads the author to critically examine the precious underlying assumption. Specifically, the author noticed the assumption rests on an implicit premise: the presumption that these two distinct disciplines of knowledge are potentially interconnected. Consequently, to refine the hypothesis, the author proposes an adjusted statement: there is the possibility of interconnection between first-order logic operations and divination based on the Yijing.

The hypothesis relies on that epistemology evolved in response to advancements in scientific knowledge. Epistemological progress has redefined what was once considered unknowable or inexplicable. Consequently, given the introduction of first-order logic by Frege in the 19th century, which offers a rational framework for understanding complex phenomena, it is imperative to reevaluate the connections within divination based on the Yijing, particularly those labeled as "synchronicity," where traditional causality falls short in providing adequate explanations [7].

3. Theoretical frames and questions beyond

To begin, one needs to answer the question, how does first-order logic guide people in using language? The principles that underpin the application of first-order logic in guiding human language usage are rooted in the utilization of predicate logic to delineate the relationships existing between subjects, predicates, and arguments within propositions. First-order logic introduces quantifiers, namely universal quantifiers (signifying "for all") and existential quantifiers (indicating "there exists"), to enable the quantification of subjects within propositions. This quantification facilitates the precise expression of statements and relationships [8].

To further explain, first-order logic involves the formalization of natural language statements, a process through which they are transformed into formal logical expressions, divested of the linguistic meanings they hold in real-world contexts. This detachment is a crucial step that enhances the clarity of their structure and meaning. In practice, first-order logic provides a comprehensive set of rules and inference mechanisms, empowering practitioners to derive novel conclusions from given logical expressions. These conclusions serve as guiding principles for the rigorous application of logical reasoning within the realm of language. Also, the purpose includes describing the intricate relationships that exist between sentences and propositions in natural language. This application facilitates the computation of truth values.

Primarily, symbolization involves the process of abstracting events into conceptual symbols. These symbols undergo computations, ensuing outcomes subsequently aligned with the real-life context. This method diverges from first-order logic, where the symbolized objects typically pertain to numbers. In this context, natural phenomena are symbolized, such as "mountain," "thunder,"

"water," "fire," "wind," and "marsh." These natural phenomena are conceptually associated with attributes and relationships within human events, effectively representing phenomena intrinsic to human events. Notably, each natural phenomenon can encompass multiple facets of human events, and these facets do not overlap across different natural phenomena. For example, "mountain" signifies halting, "thunder" signifies acting, "fire" signifies enlightening, "water" signifies difficulty, "marsh" signifies joy, and "wind" signifies omnipresence and ubiquity. Simultaneously, "wind" also symbolizes assistance, while secondary or tertiary interpretations are also applicable to other natural phenomena. The specific interpretation of each natural phenomenon within a given event hinges on the specific hexagram and the human event under consideration. Symbolization does not cease here; upon amalgamating these eight fundamental symbols, secondary symbols emerge, known as the 64 hexagrams. These hexagrams are no longer named after natural phenomena but are instead denominated after human events [9]. Significantly, the human events employed for nomenclature in this context remain symbolic and do not represent the actual events entailed in the divination process. For instance, the combination "upper fire, lower wind" is referred to as the "Ding Hexagram." The original connotation of "ding" pertains to "the tool for cooking" a human-crafted entity not associated with the realm of natural phenomena. Nevertheless, within the field of hexagrams, the "Ding" hexagram symbolizes profound reformation, signifying akin to the comprehensive change of every grain of rice within a pot during the cooking process. Furthermore, when focusing specifically on the Ding hexagram, it is discernible that the combination "upper fire, lower wind" can be linked to the symbol "Ding" both in terms of natural phenomena and its signifying meaning. In the context of natural phenomena, the cooking tool necessitates the infusion of wind beneath the fire for cooking purposes. Concerning signifying meaning, the implementation of enlightened ideas necessitates assistance. When the concept behind change is dispersed throughout all aspects of reform, a holistic transformation becomes viable.

Unlike first-order logic, where the symbolization process detaches from linguistic meanings, the symbols within Yijing retain an abstract connection to the actual content. It encompassed the second principle: position. The position entails the significance of the location of each element. For example, the "first line" and "last line" within a hexagram often bear different meanings signifying the inception and conclusion of an entity or process. Moreover, the connection among different positions of lines is significantly regarded. To explain, the interactions with one or two adjacent lines or paralleled lines yield more insights into explaining the hexagram. For instance, the first three lines represent the internal altogether, while the last three lines signify the external, denoting an internal-external relationship that existed in one event. In the interpretation of hexagrams, one must consider the meanings and positions of all lines to attain a comprehensive grasp of the entire hexagram. Consequently, the principles guiding hexagrams within human events encompass two pivotal elements: symbolization, which involves the symbolic representation of natural phenomena signifying phenomena within human events, and interconnections between symbols and their multifaceted meanings; and position, which encompasses the locations of individual elements and their interactions. Each principle encapsulates a multitude of practical strategies.

There are researchers who employ decision science to give a reason for the divination based on the Yijing [10-12]. Specifically, decision science is an interdisciplinary field to study and analyze the decision-making process. Mathematical and computational models to represent decision problems are created, and human habits and psychological and behavioral characteristics are processed to get results. Literature indicates that the accuracy of divination based on the Yijing relies on the creators of the Yijing having access to an extensive statistical database of human events, habits, and attributes. However, due to its fixed model, it lacks the ability to self-learn and correct. In this context, the author distinguishes the essential differences between decision science and divination based on the Yijing.

Firstly, decision science provides a range of answers following calculations, representing possible solutions, and assists decision-makers in making wise choices among these options. On the other hand, divination based on the Yijing yields a sole answer after calculations, which is not a set of options but rather a statement about visible and invisible facts within their context, without actively

intervening in human decisions. Secondly, since decision science necessitates the selection of the best solution from a range of options, its calculations involve standards and weights determined by human cognition, behavioral characteristics, and constant feedback, which can vary. However, divination based on the Yijing does not have criteria, as it regards all facts as having equal weight. Thirdly, answers provided by decision science may potentially contradict each other due to its incorporation of human cognition and behavioral characteristics as data. To give a reason, it amplifies the inherent contradictions within the thing in humans themselves. In contrast, divination based on Yijing's answers does not exhibit contradictions because it does not consider the cognitive and behavioral characteristics of the inquirer but is instead based on pure current and future facts. These distinctions highlight the nuanced differences between decision science and divination based on the Yijing.

4. Case study

The researcher endeavors to test the validity of the divination process based on Yijing, adhering to the Theory-construction Paradigm. Epistemically, this study underscores empirical knowledge that is observable and objective. Qualitative research will be conducted, employing case studies to emphasize the verifiability and measurability of data for systematic analysis. Three firsthand narratives from individuals who underwent divination based on Yijing will be assembled as data points. Participants will be selected randomly to mitigate any potential biases stemming from geographical or identity-related factors. Each case will comprise the following elements:

- a) The divination query posed by the recipient,
- b) The real-life circumstances pertinent to the recipient at the time of the divination,
- c) The divination based on Yijing's outcome,
- d) The tangible results experienced by the recipient in their life three months post-divination,
- e) The hexagram utilized in the divination.

These three cases transpired between 2020 and 2022; earlier cases lack timeliness, and cases occurring after 2022 are presently unfeasible for retrieving real-world results. Participant narratives represent the exclusive data source. The analysis will be geared toward assessing if the result of divination can be proved by first-order logic. Concretely, firstly, three divination recipients' queries will be symbolized under the rule of first-order logic. The narrative of real-life circumstances will be the supplemented resource, for helping the precise of variables, predicates, quantifiers, and logical connectives. Then, deduction will be applied to the symbolized sentence. Finally, these deductions will be contextualized within the real world, elucidating their practical significance. The results will elucidate both parallels and disparities between the outcomes derived from first-order logic computation and those stemming from Yijing-based computations.

For Trustworthiness, this methodology offers generalizability, given that in assessing the validity of an argument in logic, an argument is valid if and only if it is impossible for all of the premises to be true and the conclusion false. One counterexample can verify that the hypothesis is not impossible. Therefore, despite the utilization of only three cases in this experiment, the truth value obtained carries transferable implications. Nevertheless, this method exhibits limited validity. Due to the exclusive reliance on knowledge derived from first-order logic, it remains challenging if the assessment of divination based on Yijing requires cross-branches of knowledge in logic. The test of divination based on Yijing with other branches in logic can be continued in future research.

4.1. Case 1

4.1.1 Time of divination and divination query

It is dated in June 2022. The divination query posed by the recipient is: I wish to inquire about whether I want to pursue a Ph.D. position under my current supervisor. What will happen?

4.1.2 The real-life circumstances pertinent to the recipient at the time of the divination

I was nearing the end of my master's degree and had already completed my thesis defense. I had secured a job in the provincial capital city of my hometown. However, because I aspired to become a university or vocational school professor in the future, I still harbored ambitions to pursue a Ph.D. I had discussed this with my current supervisor, and he was aware of my intentions. He mentioned that as long as I followed the regular application process, submitted the required materials, and passed the entrance examination, I could become his Ph.D. student. Nonetheless, I was feeling quite apprehensive. I was aware that getting into our university's Ph.D. program was highly competitive, with only one year available for preparation, and I hadn't yet published any research of my own. Thus, I wanted to cast a divination to gain some reassurance.

4.1.3 The divination based on Yijing's outcome

The divination yielded the "Marsh and Wind Da Guo" hexagram, with a changing line at the second place, the calculated future hexagram is called "Marsh and Mountain Xian". The diviner shared the following insights with me: Firstly, pursuing a Ph.D. with my advisor was feasible. No big negative thing will happen if I do this. However, I cannot see outcomes emergently because the timing was unfavorable due to inadequacies in my foundation. Nevertheless, my future hexagram indicated favorable prospects. It depicted my foundational growth from a small tree to a grand mountain, signifying that I could now withstand challenges that were previously insurmountable. The Yijing used these metaphors to explain the hexagram. Furthermore, they pointed out a saying from Yijing, "Independent and fearless, disappear from the world of fame without boredom," suggesting that if I were truly committed to research, there might be numerous challenges ahead. I was advised not to be afraid. There would also be many days filled with silent, unacknowledged efforts, but I should persevere without feeling disheartened. These were the main points I remembered from the divination.

4.1.4 The tangible results experienced by the recipient in their life three months post-divination

Initially, when I began my job, I had ideas for the papers I needed to write but no empirical data. Over the course of the year, I gained more insights from actions, and I have now started writing my papers. If I can publish this paper, it will increase my chances of being selected for the Ph.D. position, as the divination also reminded me that my eligibility was not yet sufficient. After graduating, I didn't rush to apply in the following year; instead, I planned to continue applying in the later years.

4.1.5 The hexagram

It utilized in the divination showed Da Guo Nine the second, with a Bian Gua of Xian.

4.2. Case 2

4.2.1 Time of divination and divination query

It was dated in November 2020. The divination query posed by the recipient, what will happen if I change my job?

4.2.2 The real-life circumstances pertinent to the recipient at the time of the divination

I'm a fitness trainer, and my boss, during the early days of his startup, encouraged me to be his tech shareholder who invests the skill knowledge instead of money. However, despite putting in a lot of hard work over the years, I ended up making very little money. Moreover, because I was one of the shareholders, my boss piled on extra tasks for me. Starting this year, he promoted me to a managerial role, but it was essentially just a title. When there was work to be done, they'd approach me, but I didn't have any real authority. My salary only had a marginal bump, and those extra responsibilities began eating into the time I could dedicate to my clients. Remember that teaching classes to these clients is the mainstay of my income. So, I began contemplating switching my work environment, and I was even thinking about leaving the fitness training profession altogether. It's been incredibly draining, and there's been very little time for rest. However, I'm not sure what else I

could do for a living. If I change jobs, I'm pretty sure the clients I currently have won't follow me to my next company, and it'll take a long time to build a stable client base again at a new gym, which means I might have a period of low income. Hence, I decided to seek guidance from a divination.

4.2.3 The divination based on Yijing's outcome

The divination revealed the "Fire and Thunder Shi he" hexagram with a changing line at the second place. The diviner explained that if I wanted to change jobs, it would take approximately four months to see concrete results. The four-month wait was largely attributed to my own hesitation. The diviner suggested that I seemed to be "afraid of wolves in front and tigers behind," indicating some reluctance in my actions. They also pointed out that my discomfort in my current job stemmed from high demands for my positions, which exceeded my abilities and available resources. Feeling uneasy under these circumstances was entirely normal. Regarding future changes, the diviner foresaw that separation will happen in my life. However, the situation following this separation would closely resemble my present circumstances. Mainly, my working and my life situation will remain similar because my need in my current life is unchanged, which is to earn money for living, in my understanding. Nevertheless, because I was actively seeking self-improvement, the diviner assured me that "small matters" and individual-level wishes would have positive outcomes.

4.2.4 The tangible results experienced by the recipient in their life three months post-divination

In the late spring of 2021, he made the switch to a different fitness center located in another commercial area, joining a new company. His work remained quite similar to my previous role, which was giving classes to clients every day. However, he was no longer holding a managerial position, and there were no more shareholder jobs. The new work environment was larger in terms of space, but it closely resembled my previous company in nature. As fitness trainers, They are well aware that spring and summer are peak seasons when more people decide to start working out. He intentionally chose this time to transition to the new fitness center. Consequently, even though the hard beginning phase of the transition posed some challenges, it passed relatively quickly.

4.2.5 The hexagram

It utilized in the divination showed Shi ke six the second, with Bian gua of Kui.

4.3. Case 3

4.3.1 Time of divination and divination query

The date of Divination is in August 2022. Seeker's Query should I visit the capital city to see my daughter?

4.3.2 Real-Life Context at the Time of Inquiry

My daughter went to the capital city for an internship three months ago. She rented an apartment there and had a female roommate whom she didn't know at first but got along with gradually. However, lately, they've had some arguments. It seems the roommate often brings unfamiliar people over, and they haven't been communicating well about it. My daughter mentioned this when we were having a call, and I noticed this issue drives me a lot of worry. Finding a new place to rent in the capital city isn't easy, and I have no idea what kind of new roommate she might encounter again. I'm considering buying some gifts and going to the capital city in person to check on my daughter and the situation between them.

4.3.3 Divination Outcome

The divination yielded the "Fire marsh, kui" hexagram, with a changing line in the first place. My future hexagram after the calculation is "Fire Water, weiji". The diviner explained it as follows: The story-based explanation in the hexagram talks about two girls living together with differing mindsets. Usually, it is a metaphor, but coincidentally, I had the same situation. To continue, the unpleasant situation between them won't bring significant regret or loss in either me or my daughter. There won't

be any huge disasters. The diviner also shared the story from the hexagram, which conveyed the idea that when a horse is lost, there's no need to make an effort to chase it; it will return on its own. This implies that the two young ladies, during the time they living together, might reconcile by themselves. The hexagram suggests that if I were to visit the capital city to try to improve their relationship, it wouldn't be something suitable for me to do, and it wouldn't bring significant benefits. Their relationship wouldn't undergo any substantial changes because of my visit.

4.3.4 Real-Life Outcomes Three Months After the Divination

The interviewee didn't visit the capital city. Later on, it turned out that the two of them resolved their issues on their own. He realized that sometimes he needed to trust his daughter and her ability to handle things.

4.3.5 The hexagram

The hexagram utilized in the divination showed Kui Nine the first, with Bian Gua of Wei Ji.

5. Conclusion

A comparison and contrast between the logical frameworks used in decision-making science and those utilized in Yijing's divination is presented in this paper. It is possible for us to express and examine claims related to objects, attributes, and relationships with more accuracy as a result of the text's elucidation of a large number of essential ideas, including predicates, quantifiers, and variables. We are able to express, assess the validity of, grasp, and reason about a wide variety of complex real-world scenarios thanks to first-order logic. This article uses first-order logic as a technique for reevaluating the case studies provided by the persons who obtained divination. The case studies were presented by individuals who had received divination. In order to give a more full comparison and description of the subject at hand, the researcher carried out an initial analysis of the interview recordings. It is suggested that further research should make use of more interview materials and samplings.

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