The Thinking Paradigm of Judicial Proof

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Abstract

With the complexity of social relations, the traditional formal logical thinking cannot solve the hard cases. Inference to the best explanation, a formal logical model of evidential reasoning with proof standards, is applied to this task. The model instructs us to infer from the available evidence to the hypothesis, if the hypothesis correct, which can best explain that evidence. More narrowly, a number of plausible alternative explanations for evidence being observed at trial are generated. Then it enables legal decision-makers to evaluate evidential reasoning by comparing stories on either side of a case, selecting one as the best explanation of the evidence among them. This is a process of elimination. It happily combines falsification, inference and explanation. While traditional logical reasoning is a process of confirmation. Inference to the best explanation has been introduced to law by many scholars, so as to make up for the shortcomings of the logical thinking method. While the article concerns how to apply it in criminal case facts.

Keywords: inference to the best explanation, criminal cases, the facts of the case

1. Introduction

Judicial fairness is the lifeline of the rule of law, but recently many misjudged cases have pushed it at the cusp. The premise of judicial fairness is that the judges can ascertain the facts of the case correctly and apply the law accurately, and only ascertain the facts of the case correctly can the judges apply the law accurately. The survey conducted by Professor He Jiahong showed that 96.4% of the misjudged cases were caused by ascertaining the facts of the case wrongly, so most of the wrong cases resulted from problems of the (Liu Pinxin, Guo Xinyang, Wang Jia, et al., 2009) fact finding. Using valid evidence to ascertain the facts of criminal case must have reasonable grounds and justified basis, therefore, it is beyond doubt that facts-finding in the trial needs the correct logical thinking. The logical thinking that using valid evidence to ascertain the facts of the cases include deductive reasoning, inductive reasoning and the modern logical thinking methods of fuzzy reasoning and probabilistic reasoning. Fuzzy reasoning and probabilistic reasoning belong to mathematical reasoning. The logical thinking methods used in determining criminal cases are mainly deductive reasoning and inductive reasoning. However, with the rapid development of science and technology, the speed of social change is accelerating. According to the viewpoint of legal formalism insists—solve the facts of the cases by using the law and the fixed formal logic—It is difficult to deal with some difficult cases. The traditional method of logical thinking has great limitations in the social sciences. Legal skepticism also believes that formal logic itself has its own limitations. It is very difficult to solve all the facts of cases through formal logic. Therefore, in view of the limitation of formal logic, many scholars introduce inference to the best explanation (be called IBE for short) to make up for the shortcomings of the above logical thinking method, so as to solve the problem of the fact-determination in difficult cases in judicial practice. However, it is exiguous in China how to apply inference to the best explanation in criminal case facts.

The chapter is divided into seven parts. Part I is introduction. Part II of this paper introduces the deficiency of formal logical reasoning in the fact confirmation of criminal cases. Part III of this paper gives a description of

inference to the best explanation. Part IV explores whether IBE can be applied in ascertaining the facts of criminal cases or not. I will restrict my analysis to criminal trials. Part V provides a process of inference to the best explanation for the fact confirmation in criminal cases. Part VI illustrates this model by means of a case, the Chen Hui case. Part VII is the conclusion.

2. The Deficiency of Traditional Logical Reasoning in the Facts of Criminal Case

2.1 The Limitation of Deductive Reasoning in Law

Deductive reasoning plays an important role in facts cognizance of criminal cases. Its advantage lies in if the premise is true that conclusion must be true and the certainty of the premise transfers to conclusion, as a necessity of reasoning, a requirement of forming an effective reasoning is that the deductive reasoning premise is distribution at least once. (Burton, S. J., 1998) However, in judicial practice, this requirement is hard to be satisfied. Justices tend to make inferences about the observed evidences from the perspective of empirical knowledge, which is derived from inductive reasoning and inductive reasoning is often undistributed. Under the states, if the conclusion drawn is regarded as an inevitable result, which inevitably reduces the objectivity of the facts affirmed in the case and even departs from objective facts. Professor Yong Qi in his book *Legal Logic* said: "According to years of handling experience of judicial personnel, it is often found that those who fleeing crime often wear no gloves to commit crimes, while those who commit crimes in one case just did not wear gloves to commit crimes." (Qi, Y., 2016) Then according to the way of deductive reasoning, it cannot be concluded that the criminals in this case are fleeing. This form of reasoning may not be good to applied in here, but it cannot be said that the empirical premise does not play a role in ascertaining the facts of the case, except that, this empirical knowledge has certain support for the conclusion and the conclusion is plausible. The plausibility is that this conclusion is reasonable to the interpretation of the observed evidence, not the validity, the validity refers to the true value of deductive reasoning. In the natural sciences, the main premise of deductive reasoning is scientific and theoretical knowledge proven through experiments. However, the major preconditions in the social sciences, especially in the facts-finding of the case, are people's summary of experiential knowledge in daily life. We cannot say that such knowledge is not reliable, but the knowledge is summed up by incomplete induction, it is difficult to ensure that there is no exception. In judicial practice, it is very difficult to guarantee the reliability of the conclusion because of the undistribution of deductive premise. Professor Yong Qi also believes that the ability of deductive reasoning also depends on the observing ability and the background knowledge of the judicial staff. However, the background knowledge held by the judicial staff is always limited. The criminal phenomena are complicated and sometimes it is impossible to find the basis for criminal phenomena from the scientific theory. In Hard Cases causes the limitations of deductive reasoning to emerge. Whether the observation is accurate or not depends on whether the observation is biased or not. In practice, it is inevitable to avoid injustice if using the result of observation with subjective prejudice to deductive reasoning directly. The logical form of deductive reasoning is difficult to ensure that it fully complies with the rules of the relevant deductive reasoning. The factual determination of the case is usually not completely valid. Ignoring the incomplete validity of such forms of reasoning and dishonestly ascertaining the facts of the case will also make the identified Legal facts and objective facts biased. (Qi, Y., 2016)

2.2 The Limitations of Inductive Reasoning in Law

One of inductive reasoning is complete inductive reasoning, which summarizes the commonness and comes up with the general conclusions about a class of things. The other is imperfect inductive reasoning, the premise contains a part of a class of things, and in the partial object has not been found counter-examples, then coming up with the common attributes of such things. (Qi, Y., 2016)

In judicial practice, facts-finding is a process that reasoning the facts of the criminal cases through a set of evidences or a series of facts. Because human have the limited cognition ability and the perpetrators often destroy a part of the evidence in order to evade the responsibility so that evidence is often not fully inadequate, the process that using the observed evidence to find the facts of the cases is imperfect inductive reasoning, Professor Wang Yaxin also argued inferring from evidence to the case-facts reasoning is the method of "imperfect Induction" reasoning. (Wang, Y., 2001)

When observing a large number of swans are white, we conclude that "all swans are white," inductive reasoning solves descriptive problems only from the aspect that "what a certain kind of things is", rather than from "why swans are white" to explain the conclusion "what it is". In judicial practice, the process of determining the facts of criminal cases is mainly the process that the parties and the judge explaining the evidence to construct different factual versions and choosing the best explanation. (He, J., 2007) In *Proof and the Best Explanation*, Michael S. Pardo and Ronald J. Allen discussed the nature of judicial proof, argued that judicial proof was not probabilistic but interpretative, proposed during the first phase of the trial, the parties promote the formation of different versions of the facts of cases, the judge may also propose his own version of the story based on the evidence he or she observed. In the second stage, he will select version of the story that can best explain the

evidence presented in the court according to the interpretation of the consistency, completeness, uniqueness and other standards based on the legal system and the reasoning preferences of the judge, the version is factual conclusion. (Pardo, M. & Allen, R., 2008) It is an insurmountable problem why you explain these evidence in the process of explaining the evidence. The main core point of inference to the best explanation is "explanatory considerations guide the reasoning", if the hypothesis is true, then the hypothesis will provide the best explanation for the observed evidence; The hypothesis that provides the best explanation for the phenomenon is true. In this model, we can judge which hypothesis is true or compare the degree to which the hypothesis explains the evidence, that is, our understanding of the phenomenon is accomplished by screening the competitive hypothesis. The Lipton`s IBE Model is based on a comparative causal model. The Causality Model itself answers the question of "why". The screening of competing hypotheses illustrates why choose A instead of B and gives a good reason for believing the hypothesis is true.

Every observation of a white swan would increase the credibility of this conclusion, but the conclusion was false when a black swan was observed, and the imperfect inductive reasoning is a confirmed process. In *Logic of Scientific Discovery*, Popper once discussed that induction is actually speculative hypothesis, the theory of science can be established through falsification, so as to completely negate the status of induction in scientific development, no matter how many white swans we observed, we cannot prove conclusion that all the swans are white. (Popper, K., 1986) The standard of criminal conviction in our country is "exclude reasonable doubt", which shows that the thought of falsify is even more important than verify in finding the case facts. Wigmore has also suggested that the danger of inductive reasoning lies in the possibility that other explanations would exist in addition to the fact that it is claimed through deriving from the evidence. (Liqiang, F., 2016) In finding the facts of cases process, it is more important to ensure there is no other innocent conclusions that explain the observed evidence or a series of facts to improve the reliability of the conclusion. Screening competitive hypotheses in IBE model is the process that excludes other hypotheses, falsification has been accompanying before we choose out the best explanation to ensure the high reliability of the conclusion. And IBE is an extension of the notion of "self-confirmation" that the resulting hypothesis can explain the phenomenon better, and phenomena confirms the hypothesis, such as: When you observe footprints on the snow in front of your door, the passage of people from here is the best explanation of the footprints observed, the footprints on the snow is evidence of the passage of people from here, the hypothesis is corroborated by footprints. A steal something can best explain the evidence phenomenon, and these evidences prove that A implements theft.

IBE not only tries to produce hypothesis but also tries to evaluate the conclusion. It overcomes the deficiencies of induction and deduction. IBE as plausible reasoning has greater applicability than deductive reasoning and inductive reasoning.

3. Inference to the Best Explanation

3.1 Theoretical Development

IBE is the concept of logical philosophy, foreign research on the IBE is already quite rich. IBE stems from Pierce's "abduction", which has the role of producing a hypothesis in that time, which is the process of deducing an unknown cause from a known result. Peirce's abductive reasoning is as follows:

(1) The surprising fact C was observed;

(2) If A is true, it can explain C;

(3) So believe A is true. (Weipeng, L., 2017)

Peirce serves abductive reasoning, an initially descriptive hypothesis is derived from the observed results through abductive reasoning, as the third reasoning model besides deductive reasoning and inductive reasoning. Inference is not just a method of discovering science, it is also an explanatory reasoning process. (Deming, L. & Jiayuan, L., 2015) In the legal field, it is generally used to find the facts of case in the criminal investigation, there are few chances in using it to solve hard cases in judicial adjudication.

Hansen illustrates the scientific discovery is the tracing back from interpretant to explanandum by discussing Kepler's process of discovering planets. Explanandum is the observed phenomenon that needs to be explained. Interpretant is explanatory hypothesis that can explain the observed phenomenon, he believes that the discovery of science is neither deductive nor inductive, but also abductive, which further illustrates the important role of "abduction" in scientific development. (Hangzan, W., 2013)

In his book *The Best Explanation Corollary*, Harman first proposed this concept in order to elaborate on enumeration induction is "incomplete induction". He argues that enumeration induction is unreliable, and when it is reliable, it is the more fundamental case of "IBE reasoning". (Lipton, P., 2007) Harman came up with IBE. There is more than one hypothesis to explain evidence, but why do we choose one of them instead of the others? We need to exclude all the other hypotheses from all the hypotheses, and Harman gives the criteria for

measuring the best explanation, such as simplicity, rationality, descriptivity, etc. IBE allows us to confirm how we can change the conclusion from "All observed A are B" to "All A are B". (Campos, D. G., 2011)

RR. Thagard further made up for the key inadequate of Hallman's IBE through explaining "best" criteria of IBE, such as construal, simplicity, and analogy. (Campos, D. G., 2011)

Lipton perfected IBE model based on a comparative causality model and defended the model of IBE against the challenge of disproving the model.

The basic model is:

A. E (Observed phenomenon)

B. H_1, H_2, H_3, H_4…… (Putting forward all reasonable hypotheses on observed phenomena at the level of human knowledge)

C. H_B is the best explanation for E with the background of e

D. So, H_B is true (Xiaoxue, R. & Xiaobo, Z., 2012)

IBE is double-filtered. For the first stage, policy-makers choose competitive hypotheses in all positive hypothesis based on their background beliefs through abduction reasoning. The second stage, filtering the best explanation from the competitive hypothesis.

3.2 The Essence of IBE

The core idea of IBE is "explanatory considerations guide reasoning", which hypothesis will be accepted depend on the degree to which they conform to the evidence, the hypothesis is true that has a best explanation for a set of observed evidence than other hypotheses. But what does make the hypothesis H_B better than the other hypotheses in multitudinous hypotheses? what is the "best" criterion? The basic IBE model does not elaborate on them. Harman put forward the "best" standard that includes simplicity, rationality, explanatory, less the premise of the hypothesis. (Lipton, P., 2007)

Sagard considers the best standard includes consistency, simplicity, and analogy. (Darwin's Best Interpretation) The criterion of consistency examines the extent to which a theory can account for phenomena, that is, how many phenomena can be illustrated by the hypothesis, Darwin's the theory of natural selection, "the survival of the fittest in natural selection, survival of the fittest", to explain the evolution of all species, Creationism can explain more phenomena but can not explain the inconsistency of living habits of different species. Therefore, it can be said that Darwin's theory of natural selection is highly consistent with biological evolution. Simplicity refers to that the concept of a theory has upper concept, the form of expression is simple and the assumptions of the premise are less. Analogy is analogical reasoning, With the help of familiar theory, inferring the unknown theory through analogical reasoning, the hypothesis in scientific discovery is instructive and it is an important method for scientific discovery. (Amaya, A., 2008)

In order to better explain the "best" standard, Lipton proposed that the search for the best explanation should be carried out in a comparative context. The comparative context necessarily needs the objects of comparison. The objects of comparison are the foil hypotheses. There is no point in seeking the best explanation without the comparative hypotheses. How to choose the foil hypothesis is determined by the context in which the model applies, Lipton considers the best criterion to be "the loveliness". (Lipton, P., 2007)

Loveliness and possibility are two quite close concepts, the possibility refers to truth, the loveliness refers to potential comprehension. The most lovable explanation is the hypothesis that can better explain the observed phenomena than other hypotheses. The hypothesis of possibility is sometimes not necessarily the lovable hypothesis, the observed phenomena that marijuana tends to make people sleepy is explained by the hypothesis that marijuana have attribute of hypnotic power, it is a very highly probable hypothesis rather than lovable hypothesis, because it does not give more explanation to the problem of cannabis marijuana, it is hard to be convincing. (Lipton, P., 2007) But in the hypotheses generated on the basis of evidence and related background beliefs, the most lovable hypothesis chosen on the basis of the merit of interpretation is generally the hypothesis of possibility. Explaining the extent of the phenomena and the criteria of consistency and simplicity led us to choose the competitive hypothesis, some argued that these criteria were too vague, but this was allied in part to the uncertainty of the conceptual extension of language, and the uncertainty is normal in the social sciences, the more lovable hypotheses that can explain a wider range of phenomena, interpret the observed phenomena more coherently, and have fewer special preconditions, can always be selected by comparison with the foil hypothesis.

4. Possibility of IBE in Criminal Case Facts

Some scholars argue that "loveliness" is subjective to judge which hypothesis is the best, Lipton considers IBE is a more detailed inductive reasoning, subjective factors are indispensable for using the inductive inference to generalize the listed premises, after all, the range of extension of the inductive conclusion is wider than the

premise, the definition of the scope of the extension inevitably have subjective judgments, but inductive reasoning on the status of scientific reasoning is not shaken after thousands of years.

On the one hand, exploring the truth is a process of discovering evidence and confirming the facts on the basis of evidence in law, finding the facts of the case itself has subjective factor. Inference and judgement are indispensable in this process. In law, the process of searching for the truth is also called case reasoning. It is an explanation for an unknown case, an explanation of the causal relationship between objective facts and a prediction of the future result, and the standard of facts-finding in the court needs reach legal truth. Single-dimensional in time sequence decides the case cannot reproduce, and the judge recognizes the case fact mainly based on evidence presented to the court, extracts information of evidence according to the subjective initiative of the judge. The parties often have their own statements, the judge should be based on experience to distinguish authenticity. Theory and experience must have subjective factors. What the judge touches upon only the partial and limited information of the case. The reasoning must be a combination of subjectivity and objectivity under the circumstances of such incomplete information.

Probabilistic reasoning may be more accurate in the field of natural sciences with reproducible trial, the conclusions drawn by it are more persuasive than the IBE. However, in the field of social sciences, the main object of study is the society. Society is mainly composed of the various interests among people. The objects studied in this area are complicated because the objects are constrained by social variables of non-linear change. Probabilistic reasoning is often not feasible to solve social science problems involving subjectivity and complexity, the conclusions drawn by it may even deviate from the actual situation. It can lead to agnosticism If we overemphasize that solving subjective and complicated things in an objective way.

On the other hand, the facts-finding process is actually the process that both parties provide evidence and explain the evidence with the participation of the judge and the judge try his or her best to find out the truth and rebuild the truth. It is not random selection to put forward hypothesis, but it is came up with based on objective evidence and the judge's background beliefs. The IBE is of objectivity.

What is "the best" criterion and how does the best interpretation is put forward in the legal context? In this regard, a mature theory is not formed, especially in terms of judgment of "the best" standard in our country.

5. Finding the Facts of the Case in IBE

For the problem how to apply IBE in judicial practice, when discuss the nature of forensic proof, Michael S. Pardo and Ronald J. Allen, in their Proof and the Best Explanation, arguing that judicial proof is not probabilistic but interpretive, put forward that different parties can promote the formation of different versions of the case during the first phase of the trial stage, and the fact-maker can also propose his own version of the story according to the evidence he or she observed. In the second stage, the factual construction, which can best explain the evidence presented to the court, is selected based on the legal system and the reasoning preferences of the fact-maker according to the standards of consistency, completeness and uniqueness of interpretation. (Pardo, M. & Allen, R., 2008) Professor Allen considers that how to understand "rest assured the truth". If there is no plausible guilt, the person is innocent, and if there is plausible guilt and there is no plausible innocence, the person is guilty. If there is plausible guilt and there is plausible innocence, the person is innocent. This is the main explanation for the best explanation. (Allen, R. & Yuebo, Z., 2011) In the meantime, when the plausibly guilty case and the plausible innocent case appear simultaneously, only the verdict of innocence can be chosen. Luo Weipeng, Feng Liqiang and other scholars also constructed the model of using the IBE to assert the facts of the case during the trial stage, but they did not refer to the question of the "best" standard.

The process of establishing the facts of the case in IBE context is detailed as follow. Firstly, we must establish a different version of the competitive stories. Secondly, selecting the best one. How do we set up a story hypothesis? How do we make a comparative screening? What is the criterion of "best"? These are the questions that must be considered in seeking the best explanation of the inference. (Bex, F.J., 2011)

5.1 Generation of Competitive Story Version Hypotheses

In philosophy, Lipton argued that decision-makers come up with hypotheses based on the evidence and background knowledge available to decision-makers. The number of hypotheses in competitive hypotheses depends on the background knowledge of policymakers and the amount of material they possess. Background beliefs make referees seriously consider which assumptions should be taken into account. Therefore, the relevance of background beliefs helps to narrow the hypothesis to a limited number. (Allen, R.J., Zhuhao, W. & Yue, D., 2016) In judicial practice, the indispensable elements in the determination of the facts of the case are the evidence and the rule of experience and the logical method of science. The logic of science is a bridge between evidence and rules of experience. Therefore, the truth of the conclusion of the facts of a case depends on whether the evidence is true or not and whether the rules of experience are reliable or not, and whether the laws of logic are scientific or not. On the one hand, when the parties explain to the evidence, the story versions are formed. On

the other hand, the judge forms the story versions based on the rule of thumb and the evidence presented by parties.

The formation of a competitive hypothesis depends on the evidence available to the judge. As Schum and Taylor argued, the success we have achieved in creating important new hypotheses largely depends on the evidence we have. Therefore, the efficient investigation in the previous stage contributes to the formation of competitive hypothesis. Moreover, the formation of hypotheses and the discovery of evidence are mutually reinforcing. The judge proposes all possible versions of the stories based on the available evidence, in turn, it will prompt the judge to seek some new evidence and the judge will generate or delete some of the story versions based on the newly added evidence until a closer match is found objective facts of the story version. In this process, it is similar to archeology, obtaining physical evidence similar to fossils, judges should have the rule of thumb about animal skeleton structure to determine the skeleton of dinosaurs according to the small holes in fossils. For example, when it is found that there is bullet embedded in the victim's bones and we can arrive at a conclusion that the victim suffered gunshot wound through medical knowledge. Medical knowledge is a special experience, and the special rule of thumb has stable objectivity and high reliability essence. Others are ordinary rules of thumb. For example, if a person's bloodstained fingerprints are found on the victim, we speculate the person has contacted with the victim's body based on the common experience. It is rare for others to extract the fingerprints of the person with the blood of the victim and print it on the victim's body. It is still reliable but erroneous. The rule of thumb is insurmountable when finding the facts of the case in IBE. The judge needs to consider which hypothesis to explain which evidence and which assumptions are consistent with which evidence in order to facilitate the search for conflicting evidence or assumptions. At the end of the process, the legal decision-makers will establish some facts about the case, each fact version contains some coherent assumptions and evidence. In this case, at least three major competitive storytelling versions can be made.

Thus, the parties play an important role in the process of generation of competitive hypothesis by presenting the relevant evidence and providing relevant explanations to the evidence at trial. It is worth noting that the judges can also put forward their own story versions on the basis of evidence information. Different story versions form competitive hypotheses.

5.2 The Selection of the Best Explanation

At this stage, the judges saturate the consistency of story version with evidence by adding, subtracting evidence or reinterpreting the evidence to modify the version of the story. For example, In the O.J. Simpson Case, police obtained the evidence gloves in an improper method. The gloves should be ruled out rather than as evidence of guilt. Revisions take the exclusionary rules of illegality into account, such that the degree of consistency of the hypothesis is enhanced. (Bex, F.J., 2011) We carefully consider about the factual version of each case, providing each of the competitive hypotheses with a fair play. Then the consistency of each case theory is maximized.

Next, considering each hypothesis that explains the number of evidence in the trial and the coherence-maximization of the hypothesis in the interpretation of evidence, whether the evidence can confirm the story version or not. If one story version that explains more evidence and reaches the coherence-maximization than the others is the best one. In terms of judgement of consistency, it has been implemented in ECHO, a transformation program that analyzes the relationship between the story version of a case and evidence by using the computer-linked algorithm to make the consistency calculation work according to Thagard's interpretation. We can calculate consistency in a precise way. (Chengding, R., 1996) However, computer does not have legal restriction such as presumption of innocence and standard of testimony, thus ranking formed at this stage is just to further judge. Presumption of innocence should be respected. Although simple standard has important significance in natural sciences. What is most important in the judicial field is to obtain a story which is close to the real story, but has no big differences to concept, form and conciseness of social premise. Analogy standard is noteworthy, and it is necessary to consider results of similar cases and which similar cases have most proper background knowledge. Moreover, the purpose at this stage is to rank story versions mainly according to consistent degree, followed by simplicity and analogy. If there are plausible crimes, he will be innocent; if there are plausible crimes without plausible innocent cases, he is guilt; and if there are plausible crimes and plausible innocent cases, he is innocent, and thus obtaining an optimal story.

In practical reasoning, however, judges will to and fro among different stages. If they are not satisfied with alternative offers which they are assessing, they are likely to strive hard to seek for more evidence or seek for other hypotheses in the judging process. New evidence can urge fact finders reconsider a process of construction. Therefore, reasoning of optimal explanation perfectly explained the process of continuously getting close to objective reality of judges. Through the case of Chen Hui, we will explain the process of case facts by inference to the best explanation.

6. Application of IBE in Chen Hui Case

In this part, I will explain how IBE is applied in special cases through the case that Chen Hui killed his wife which was called "the O.J. Simpson murder case of China". 30-year-old Hu Zuying, the cohabite of 35-year-old Chen Hui who is the former division head of Yunnan aviation administration planning office, was killed. The prosecutor firmly believed Chen Hui was the suspect who killed his wife according to evidence while Chen Hui refuted the evidences put forward by the prosecutor. In the case without testimony or direct evidences, refutes of Chen Hui to indirect evidences cannot be excluded, thus in the end, the intermediate people's court of Yunnan declared his innocence. Next, we will explain rationality of judicial decision by use of the model of inference to the best explanation.

6.1 Formation of the Competitive Versions of the Truth

Evidences obtained at the stage of court investigation:

Motive E_1: during the time when they lived together, they have quarrels about children, and Hu Zuying urged to get married by reporting that Chen Hui received kickback and opened companies to launder.

Autopsy report E_2: the death time was about 5 days before the autopsy, about March 8, and she was dead from the injury in the head by blunt 6 hours after dinner in her nightgown.

Witness testimony E_3: a security guard saw Chen Hui drove home at noon on March 9.

Monitoring records E_4: on the evening of March 9, Chen Hui drove to the Red Mansion and returned back an hour and half later. Investigation tested that it would cost an hour and 24 minutes to drive there and come back after disposing the dead body.

Mobile phone location E_5: on March 9, the mobile phone of Hu Zuying to send short messages and the mobile phone of Chen Hui to receive messages were in the same base station, the work unit of Chen Hui. At that time, Chen Hui was in the work unit.

Towel covering and binding the dead body E_6: fiber composition of the towel was similar to that of the towel in Chen Hui's and DNA of Chen Hui was found there.

Latent blood fingerprints E_7: there are six fingerprints of Chen Hui in the packaging tape, which was used to bind the dead body, and two of them are latent blood fingerprints.

Computer of Chen Hui E_8: there are records of search words like "crime of intentional homicide" and "mobile phone location".

There are no any bloodstains in the car of Chen Hui E_9

Tools for criminal purpose and the mobile phone of Hu Zuying were not found E_{10}

Table 1. The judge puts forward the hypothesis of the possibility of each evidence based on experience.

evidence	hypothesis1	hypothesis2
E_1	He has motive for committing the crime.	Some conflicts have been resolved, they are ready to get married. Investigators have find out they have no economic problems. So Hu Zuying is not a threat to Chen Hui.
E_2	The victim died in wearing pajamas, she should be killed on the evening of March 8, at that time, only Chen Hui with she lived in a room, he is the most obvious suspect.	She was killed about five days ago according to autopsy result, but she may also be killed on March 9.
evidence	hypothesis1	hypothesis2
E_3	He went home to move the body on March 9.	The guard only saw him go home and did not see moving anything.
E_4	He went to the red manor to buried the body.	He went to the red manor to find Hu Zuying.
E_5	Chen Hui used her cell phone to send himself message to create the illusion of looking for Hu Zuying.	Two cell phones in the same base station, it only means they are in a relatively short distance rather than Chen Hui control Hu Zuying's phone.
E_6	These items are used to commit a crime by Chen Hui.	He and Hu Zuying lived together for three years, there must be Chen Hui's DNA on those items.
E_7	Firstly, Hu Zuying's blood stained Chen Hui's	Previously, Chen Hui had used the tape and

	hand when he killed her. Secondly, during he handled the body with tape, the blood on the fingerprint printed on the tape.	wrapped around it, then the fingerprints of Chen Hui printed on it, Hu Zuying's blood drops on the fingerprints printed on the tape when the murderer handled the body.
E_8	He searched for these words to evade responsibility	He searched for these words to find the real murderer.
E_9		He did not use car to carry the body.
E_10		Phone and crime fighting tools are taken away by the murderer

We construct different story versions based on the above evidence, as well as the hypotheses raised by each piece of evidence.

Story version of the prosecutor: on the evening of March 8, 2012, Chen Hui killed his girl- friend Hu Zuying who is in nightgown with blunt, drove the car to deliver the dead body to the Red Mansion on the next day, and returned back to the unit and used the mobile phone of Hu Zuying to send short messages to his own mobile phone after burying the dead body with black plastic bag and packaging tape so as to make fabricate the false appearance that Hu Zuying got missed to avoid responsibility. Chen Hui killed his fiancée.

Story version of the defence: on March 9, Hu Zuying used her mobile phone to send a short message to Chen Hui and said that she would go out to play with her friends and asked him to pick up the child. He called Hu Zuying but failed, thus he drove to the Red Mansion to find Hu Zuying. Chen Hui did not kill Hu Zuying. Chen Hui was framed by other

6.2 Select Optimal Story Version

At this stage, modify each story version to make them reach to the consistent saturated mode. There are no evidences needing to be excluded, thus the hypothesis that Chen Hui was framed was supported by any evidence, and it has the lowest consistency with the evidences. For the story versions of guilty, they can explain 1~8 evidences, while story versions of innocence can only explain 9~10 evidences. However, to fully explain the consistent saturation, according to the standard of excluding reasonable doubts, all evidences should reach to the standard of doubtlessness and modify evidences of story versions of guilty. As it is shown in the table, all guilty evidences have another innocent hypothesis, which would reduce consistency of story versions of guilty and fail to meet the consistent standard of Thagard. However, story versions of guilty can explain hypothesis 2 of all the evidences, thus hypothesis of the evidences can better explained. In addition, we can obtain the ranking of hypothesis consistency by calculating the value of consistency by use of the ECHO calculation model of Thagard. But the computer model did not consider presumption of innocence, thus the ranking results can be used as a reference and make further judgment combining with standards like similarity. The case is similar with the American O.J. Simpson's murder case, and Simpson was declared innocent in the end. In this case, story version of guilty and story version of innocent are like-real. When there are real-like innocent cases and like-real guilty cases cannot explain the like-real innocent cases and when assurance of human rights conflict with punishment of crimes, we will give priority to assurance of human rights. To reach to the standard of declaring guilty after excluding all reasonable doubts – the theory of no punishment in doubtful cases, we should declare Chen Hui innocent. Therefore, from a second angle, inference to the best explanation can enhance the operability of excluding reasonable doubts.

7. Conclusion

In this essay, I believe that from the perspective of rationality of case facts reasoning, deductive reasoning of inference to the best explanation and inductive reasoning have advantages. When applying inference to the best explanation in explanatory cases, it will involve why it is A hypothesis but B hypothesis. And there will be false thoughts, but people will receive the rationality of the disputable results according to the explanation. Moreover, best explanation also makes me know why results of best explanation are reasonable since it can prove itself. In criminal cases, the standard of reasonable doubt must be met and other story versions should also get involved in the vision of judges. In addition, it is very important to introduce other competitive fact versions, and inference to the best explanation itself has the nature.

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