

Behavioral Heuristics of Chinese Education

– Insight into the World’s Largest Education Market Through Behavioral Economics

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Abstract: Reflections upon the acuteness of human intuitive decisions have spurred explorations of interest in behavioral heuristics. While the field has successfully rationalized unexpected outcomes in dissonance against the standard expected utility framework, the path to which its seeming intangibilities make utilitarian contributions toward behaviors and interactions within economies is still yet to be endeavored. Such studies received particularly little attention in China, where awareness of systematic behavioral biases remains limited to the majority of the public, hindering the efficiency of the country’s efforts toward economic development. This dissertation reviews the education system of China, an imperative mechanism, yielding millions whose capabilities and propensities define the prosperity of the world ahead. Through personal experience, a hypothesis was formed around hyperbolic preferences, cognitive dissonance, and the decoy effect. Combining the rigors of survey and the humanistic nature of ethnography, primary research was conducted with students from a district key high school in Shanghai. Results evidently showed students’ tendencies to overvalue one-dimensional test scores while overlooking the potential for un-materialized skills, as well as their nonperformance of creative or critical abilities. Meanwhile, the uprise of international options (AP, IB, A-level, etc.) induced even higher levels of dependence on local education amongst non-international students, as a result of asymmetric information, deepening their oblivion to potential misjudgments due to cognitive bias.

Keywords: behavioral heuristics, education, China, hyperbolic preference, decoy effect, cognitive dissonance

1. Introduction

Behavioral heuristics are mental shortcuts that simplify decision-making [1]. Although heuristics reduce time and cognitive strains, they can also lead to systematic errors such as biases or fallacies in decision-making [2]. The notion of integrating psychological and cognitive interpretations of sociological phenomena in the past century has developed into the systematic study of behavioral sciences. The increasing acknowledgment of human bounded rationality has made insightful contributions in various areas, from microeconomic business ventures and healthcare services, to the implementation of public policy and aggregate growth statistics. However, the implications of such

heuristics in the field of education itself are often overlooked. While education systems aim to develop cognitive abilities through knowledge acquisition and skill attainment, inherent biases in the cognitive system often impose interferences to the efficiency of the process aimed to enhance it. The immaturity of the minds of young children makes them particularly volatile to misjudgments or irrationalities induced by subconscious heuristics. Hence, it becomes imperative to recognize cognitive biases within education, so as to diminish their hindering impacts on the development of the future generation. Equally, as behavioral heuristics are ultimately unpreventable, education systems can be modified to accommodate such processes, constructing the optimal mechanism in which intelligent young minds can be cultivated.

This dissertation retains focus on the educational system in the People's Republic of China, specifically the Nine Year Compulsory Education Program. With theoretical understandings of hyperbolic preferences, cognitive dissonance, and the decoy effect, this dissertation provides insight, through the lens of behavioral economics, into potential shortcomings of education towards sustainable development in China. As the world's fastest-growing economy, China needs to incorporate innovation and diversification, raising demands for such abilities amongst its future generations of citizens. While the conventional educational system showed proven success in cultivating hard-working, intelligent workers, there are now additional demands for creativity and critical skills. Behavioral economics offers a unique angle at potential adjustments for the Chinese education system, if not an entire educational reform, in becoming an efficient factor towards the country's sustainable growth.

2. Literature Review

2.1. Behavioral Heuristics in Education

Most literature discussed the impact of heuristics on educational outcomes generically, without making references to any specific educational systems. Levitt et. al offered insight into the implications of hyperbolic preferences on education, in that the motivating power of future rewards is insignificant against immediate rewards [3]. Lavecchia et. al added to this finding, using the System 1 and System 2 frameworks to rationalize the fact that the present is overemphasized, causing individuals to act myopically [4]. Meanwhile, a study by Bettinger and Slonim found that children and adolescents are especially volatile to hyperbolic discounting, due to the biological development of their limbic system, raising concerns over the rationality of teens' educational choices toward long-term outcomes [5]. In addition, the extent of hyperbolic discounting's impacts varies both across people and within individuals, depending on factors such as stress, distractions, and cognitive development [4]. While literature discussions focus on children's tendency to overemphasize the opportunity cost of studying (games, television, friends, etc.), this dissertation examines the implications of hyperbolic discounting for Chinese students specifically, who overemphasize the immediate reward of high test scores, yet overlooking more prominent, long-run rewards of interdisciplinary education. Evidently, Chinese award-winning writer Zhao writes that 'Chinese students have been known for being great test takers at the cost of creativity' [6]. Their excellence in international assessments and academic contests comes at the cost of creativity, innovation, and entrepreneurship, argues Zhao. The claim is validated by the fact that China has not produced Nobel prize winners in science, nor any high-quality, globally influential patents or research.

According to Lavecchia et. al, overreliance on routine and automatic thinking also offers an explanation for sub-optimal education outcomes [4]. Correspondingly, Zhao describes the Chinese education system as 'a well-designed and continuously perfected machine that effectively transmits a narrow band of predetermined content and cultivates prescribed skills' [6]. The terms "routine", "predetermined" and "prescribed" allude to the heuristic of cognitive dissonance. Aronson and Tavris

defined cognitive dissonance as “When people feel a strong connection to a political party, leader, ideology, or belief, they are more likely to let that allegiance do their thinking for them and distort or ignore the evidence that challenges those loyalties” [7]. Due to the predisposition of System 1 to ease on familiar or default settings, individuals become, sometimes subconsciously, averse to new information. It is widely recognized within the realm of education that learning is more than the mere accumulation of facts and skills, but a critical awareness to observe, analyze, and adjust to the world around us [8]. This process, often known as “critical thinking” in literature, can be conceptually defined as a “normative enterprise in which, to a greater or lesser degree, we apply appropriate criteria and standards to what we or others say, do or write” [9]. Otherwise, Ennis simply defined it as “reasonable and reflective thinking that is focused on deciding what to believe or do” [10]. In either definition, the notion of self-awareness and reflection is imperative towards critical thinking. Yet, in Chinese school systems, where success is achieved through discipline and compliance, students find themselves homogenized, lacking the cognitive strain required to initiate critical thinking. Furthermore, Hudgins and Edelman agreed and stated that critical thinking should also require providing evidence in support of such decisions, another unachieved criterion due to System 1’s avoidance and rejection of new information [11]. Hence, as they deviate from their daily school routine and transition to adulthood, Chinese students have difficulties in leveraging their prescribed school knowledge into practice. Evidently, Farrell and Grant discovered that only 10% of Chinese college graduates are found employable by multinational businesses [12].

Since 2008, the uprise of Sino-foreign joint ventures in education spurred a trend of international divisions within local Chinese schools, as well as international high schools [13]. Unlike standardized domestic curriculums, international education offers greater freedom and choice for Chinese students, offering a variety of programs including but not limited to the International Baccalaureate (IB), Advanced Placement (AP), and A-Level [14].

2.2. Impact of Education on Growth and Development

In his book ‘The Pathology of Chinese Education’, Zheng breaks down the relationship between education and China’s development into two threads of discussion: the impact of educational outcomes on income and ability [15]. It is commonly recognized amongst scholars that the level of higher education quality is positively correlated with national income ([16, 17, 2, ...]. Evidently, empirical research shows that education has significantly contributed to poverty reduction and income inequality in China [18,19].

However, the correlation between education and ability is much more intricate and complex. As recognized by sociologist Bourdieu, intellectual yields accrued from education must be grounded on a “rigorous understanding of how the intellectual world operates”, highlighting the irreplaceable nature of the understanding of practical applications beyond the theoretical [20]. As clarified by Hanushek and Woessmann, economic development is closely related to the cognitive skills of the population, rather than mere school attainment or academic achievements [21]. If, however, education successfully elevates average intellectual abilities, it becomes “one of the most powerful instruments for reducing poverty and inequality, setting the foundation for sustained economic growth”, as pointed out by Patrinos [22]. The positive externalities of education are vital in creating a robust economy, including but not limited to higher wages, innovation and efficiency, fueling the nation’s path towards economic development.

3. Methodology

This dissertation aims to combine the scientific rigor of surveys with the depth and detail of ethnography. Using a class of 54 students from a district key senior secondary school in Shanghai as

a sample, research was conducted on traces of heuristic cognitive behavior, and its correlation to student performance. The goal was to attain not only statistical results from examinations, which were objective and quantitative, but also to understand classroom atmospheres and attitudes, which were more subjective and qualitative [23]. A greater understanding of complicated issues in a given context often requires an interpretivist angle, rather than a positivist one, which skepticizes the purely objective existence of patterns in the realm of social research [24]. Variations between students (age, gender, background, personality, etc.) mean that results for one individual cannot be extrapolated onto the entire population of Chinese students. Meanwhile, correlation does not mean causality. This is especially true for small-scale research in complicated phenomena, such as this very one, where too many variables are involved to draw justified conclusions on causality. Hence, it was very difficult to narrow down distinctive cognitive heuristics that have an impact on education and quantify the extent of its influence. However, this was not to completely overlook such heuristics, nor to disregard efforts to understand and interpret the implications of systematic biases in student cognitive behavior, to enhance educational outcomes.

4. Results

The quantitative results of the questionnaire were as follows:

Table 1: Questionnaire results.

Question Number	Question	Mean , Median
1	To what extent are your motivations affected by weekly/monthly quizzes?	4,4
2	What extent of happiness can a pleasing weekly/monthly quiz score give you?	4,4
3	What extent of happiness can a pleasing gaokao score give you?	5,5
4	What is the possibility that you will revisit and enhance your secondary school knowledge after gaokao?	3,2
5	How often do you find yourself questioning the accuracy/practicality of your curriculum's content or the effectiveness of your school's teaching methods?	4,4
6	How often do you act upon these questions?	3,1
7	Do you think your textbooks are 100% correct?	4,5
8	Do you think your curriculum and learning environment is equally appealing, if not more, than international schools?	4,4

Question 1,2,3,4 intended to investigate students' hyperbolic preferences toward educational outcomes. Responses of 4 and 5 for questions 1-3, unsurprisingly, demonstrated the substantial weight of test scores in students' self-assessments of success. However, negative correlations between questions 3 and 4 imply that the motivating powers of short-term joys, i.e. high stake test scores, come at the cost of anticipation for long-term prospects, such as internal character growth or the expansion of knowledge scopes. Through supplementary comments, 41 out of the 54 students (75.9%) mentioned phrases such as "pivotal", "determinant of success", and "intensive" when describing their attitude towards gaokao, while 36 students (66.7%) are "not sure", or "haven't really

considered” about potential means to utilize their knowledge after adulthood. Perceivably, the exam-orientated approach effectively motivates and encourages effort, but with an established expiration date. The 60% difference between the median responses for questions 3 and 4 implies a weak correlation between exam success and intellectual growth. This supports the phenomenon where Chinese students with outstanding academic achievements themselves are in a bottleneck as they face the practical demands beyond academia.

Questions 5 and 6 target to find the degree of critical abilities among students. Responses of 4 in question 5 were significantly higher than anticipated. In contrast, question 6 received much lower responses, corresponding to the initial hypothesis. Data suggests that over 80% of students displayed traces of critical thinking in their current education approach and prospects, demonstrating the presence of such skills and awareness. However, the 75% decrease in median value from questions 5 to 6 reveals that the majority of such thoughts dissipate into nothingness. Moreover, the response variance for question 6 is almost double that of question 5, demonstrating greater diversity in the extent of reluctance to act upon their critical attitude between different students, whereas most of them possess the ability. This is further supported by the median response of 5 in question 7, meaning over half of the students hold personal opinions about the suitability of curriculums, unheard by their teachers or relevant education practitioners. This not only reveals that Chinese education often fosters environments in which students are reluctant to make their voices heard, but also that future directions of development for the system remain adult-orientated, with the student perspective playing trivial roles in the process.

Question 8 specifically aims to investigate the decoying effects of the uprising trend of international education upon students in the local Chinese system. In this case, interviews and the comment section of the questionnaire yielded significantly more qualitative information, mostly of much higher value than quantitative results from numerical ratings. Despite the seeming content with local education, as demonstrated by the mean and median responses of 4, all students claimed that they had never personally experienced the settings of international education. When interviewed, students were asked about the rationale for their disinterest in international education. 47 students (87.0%) described negative rumors or imaginary scenarios, which diminished the appeal of international education. There appeared to be a common perception that the route of international education is provided for those incapable of succeeding in the local curriculum, fostering a general sentiment of disparagement towards the intellectual abilities of international students. Through further conversation, one particular subject was repetitively brought up: social media. Students explained that the typical image of international students on Chinese social media sites (Weibo, XiaoHongShu, QQ, etc.) is one largely focused on their entertainment and easiness. None of the students interviewed had any personal encounters with practitioners or students of international education, yet they held confident opinions against its value. Reasonably, the single-sided nature of information, especially due to the incomprehensive nature of social media, has implemented biased judgments toward international education, which in turn, consolidates students’ confidence in local education. Although unintentional, the uprise of international schools acted as a decoy for the dominating powers of local education, elevating levels of trust in its systematic approaches. This finding can also account for students’ reluctance to act upon their doubts toward the system (as investigated through question 6), in that the significance of such defects was partially diminished in comparison to such alternative options.

5. Discussion

To build upon the findings of this research, student behavior can be investigated through statistical comparisons between academic achievement (i.e. exam scores) and numerical representations of attitude towards knowledge. Another area of interest is whether the same heuristic results in different

responses for different students, and if so, the identification of factors determining the magnitude, or direction of biases induced. If reactions largely varied between individuals, then the education system would need to incorporate more freedom to accommodate for individualistic behavior. Otherwise, the system should be systematically modified, integrating behavioral heuristics into the generalized system itself.

6. Conclusion

Conclusions of this research may offer a new, and perhaps unconventional, perspective for education practitioners, suggesting potential strategies to enhance educational systems to accommodate for inevitable features of the cognitive process. As mentioned above, the presence of the hyperbolic preferences bias is not entirely detrimental. The goal of gaokao encourages high morale during secondary school, which contributes to solid foundational skills. To emphasize the motivating powers of long-term educational gains, adjustments can be implemented to the transition phase between gaokao and secondary school graduation. Through options such as job shadow, career workshops, or school-organized internships, students' motivation can be extended onto futuristic prospects, encouraging the notion of developing current knowledge, or applying them to relevant real-life contexts. Regarding the suppression of creative and cognitive abilities due to cognitive dissonance, more student-directed programs can be implemented, such as Project Based Learnings (PBLs) or debate, to encourage initiative and reflective skills. Finally, in response to asymmetric information on international systems, routinely conferences between local and international can be arranged. With the availability of efficient and acute communication between different communities, students can grasp a more comprehensive, accurate understanding of the differences and respective advantages, helping individuals make rational choices about the optimal path for themselves.

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