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# Effort counts: The moral significance of effort in the patterns of credit assignment on math learning in the Confucian cultural context

Bih-jen Fwu<sup>a</sup>, Chih-Fen Wei<sup>b</sup>, Shun-Wen Chen<sup>c</sup>, Hsiou-huai Wang<sup>a,\*</sup>

<sup>a</sup> Center for Teacher Education, National Taiwan University, 1, Roosevelt Road, Sec. 4, Taipei 10617, Taiwan, ROC

<sup>b</sup> Department of Psychology and Counseling, University of Taipei, 1, Ai-Guo West Road, Taipei 10048, Taiwan, ROC

<sup>c</sup> Institute of Learning Sciences, National Tsing Hua University, No. 101, Sec. 2, Kuang-Fu Road, Hsinchu 30013, Taiwan, ROC

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### ABSTRACT

Students in East Asia, including Taiwan, stand out on international math assessments and tend to attribute their achievement to effort. This study only focuses on the cultural factor with regard to the effort/credit relationship in math learning that may contribute to students' math performance. It aims to examine why effort is valued and how parents and teachers assign credit for students' effort, and thereby to establish a link among effort, moral image, and credit assignment. Questionnaires containing various scenarios were administered to three groups in Taiwan: 120 parents, 89 teachers, and 121 students. The results showed that as the mediating variable, moral image acts to explain how the relationship unfolds: Higher levels of effort lead to better moral image, thus resulting in more credit being assigned.

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## 1. Introduction

Learning math is an important but challenging task for many students. Therefore, how students perform and how they attribute their performances has been a focus of educators worldwide. On international assessments such as TIMSS and PISA, students from different countries demonstrate various levels of achievement in math. Students in the East Asian Confucian circle, such as those in Japan, South Korea, Hong Kong, and Taiwan, tend to perform well (Mullis et al., 2000, 2004, 2008, 2012; OECD, 2007, 2010). Among them, Taiwanese students ranked at the top in math performance in a series of TIMSS and PISA assessments from 1999 to 2009 (Mullis et al., 2008, 2012; OECD, 2010, 2014). Furthermore, East Asian students, including the Taiwanese, tend to attribute their success and failure to effort, rather than to ability (Chiu, 1988; Stevenson et al., 1990; Stevenson and Stigler, 1992; Uttal, 1997). With such attribution beliefs, they tend to study hard, spending much time on homework or attending after-school cram schools and enrichment programs (Chen and Lu, 2009; Fuligni and Stevenson, 1995). It would thus be interesting to examine why effort is valued so highly in the Taiwanese students' learning

processes and how such a value is inscribed into their minds through adults' intentional rearing practices.

The authors argue that the reason why effort plays such a pivotal role in math learning may lie in the fact that in the Confucian cultural tradition, a substantial amount of moral significance is ascribed to effort in the learning process. According to Li (2002–2006, 2012), the Confucian tradition teaches that learning is a life-long process of self-perfection that emphasizes deep concentration, steadfast perseverance, hardship, and diligence. These characteristics, termed “learning virtues,” are synonymous with effort. Endeavoring to learn is thus considered a moral behavior in and of itself.

The high level of moral significance ascribed to effort may have an impact on how parents and teachers assign credit to their children when they succeed in math. When students perform well, do parents and teachers assign credit solely based on students' achievement, or do they take effort into account due to its moral value? This study investigates how the moral significance of effort plays a role in credit assignment by adults for children's math achievement. It aims to uncover the mechanisms that underlie the effort–credit relationship; that is, the mediating effect of moral image resulting from the act of expending effort on learning math in the relationship between effort and credit.

It is worth noting that while there are other underlying causes, such as process of learning and teaching, types of curriculum, hours of study, assessment processes, for the excellent math performance of East Asian students, this study only focuses on the

\* Corresponding author. Tel.: +882 2 33661555.  
E-mail addresses: [Janefu@ntu.edu.tw](mailto:Janefu@ntu.edu.tw) (B.-j. Fwu), [cfwei@tmue.edu.tw](mailto:cfwei@tmue.edu.tw) (C.-F. Wei), [spsychen@yahoo.com.tw](mailto:spsychen@yahoo.com.tw) (S.-W. Chen), [wanghs@ntu.edu.tw](mailto:wanghs@ntu.edu.tw) (H.-h. Wang).

cultural factor with regard to the effort/credit relationship in math learning that may contribute to students' math performance.

## 2. The relationship between effort, moral image, and credit assignment in Confucian culture

This section presents conceptions of effort, moral image, and credit assignment that have arisen from the Confucian cultural heritage.

### 2.1. Effort and moral image

According to Hwang (1998), in general, there are two types of morality in universal human actions. One is negative duty, which requires abstention from a particular action under all circumstances (e.g., do not kill, do not steal) and is thus called a duty of omission. Individuals who do not adhere to this type of negative duty are viewed as immoral because they have committed a crime. The other type of morality is positive duty, which encourages certain types of actions under certain circumstances (e.g., practice charity when one is willing and able to do so) and is called a duty of commission. Individuals who carry out these types of actions are viewed as virtuous. However, in the Confucian tradition, there is also a third type of morality, one that requires certain actions regardless of the circumstances. This third type is called an unconditional positive duty (Hwang, 1998, 1999). One such duty is effort-making, which requires one to take actions to fulfill one's obligations to oneself as well as to other significant parties, such as one's parents, in the ethical relationship networks of the family (Hwang, 2000, 2001). Those who endeavor to fulfill such duties tend to be viewed as moral and ethical.

This moral significance of effort-making in fulfilling one's duty to oneself is deeply rooted in the traditional Chinese worldview of how the universe and human sphere operate and echo each other. In that worldview, by observing the laws of nature, which have been constantly moving, evolving, and growing since the creation of the universe, human beings, as the paragon of creation, should emulate natural laws and make unremitting efforts to improve themselves through their life pursuits. As the ancient book the *I-Ching* describes, "Just as the celestial bodies never run out of energy to orbit round and round, so we as human beings are obliged to strive unendingly to better ourselves" (*Tian xing jian, junzi yi ziqiang buxi*.) Xunzi states in his work "An Encouragement to Study" that this approach to life, that of constant effort-making, is regarded as a moral duty and an obligation for anyone who is considered human; furthermore, if this obligation is not carried out, one's behavior is unacceptable and may even be analogous to bestial behavior (cited from Lee, 1996). Constant effort is the way to cultivate one's moral perfection (Salili, 1999). Lack of effort is usually viewed as a fatal character flaw.

In addition to being a duty to oneself, effort-making is also an unconditional positive duty to one's parents (Salili, 1999). According to Confucian ethics for ordinary people, individuals' lives are the continuation of their parents' physical lives; thus, the parent-child blood bond is regarded as the cardinal relationship in all human interpersonal networks (Hwang, 1998). Mutual fulfillment of obligations—where parents should be benevolent and children should be filial (*fu ci zi xiao*)—is prescribed. One such obligation is education, which is considered the primary means of achieving upward social mobility for individuals and their families. The academic performance of school-age children is the focal concern of the whole family. Parents should provide as good an education as possible for their children to fulfill their duty as benevolent parents; at the same time, children should do their best to study hard to fulfill their obligations as filial children in return (Hwang, 1999, 2001). Those who meet such expectations are

deemed "good students" and are more likely to be viewed as possessing high moral caliber by parents and teachers. In contrast, those who do not study hard are less likely to be viewed as possessing moral caliber. In other words, the level of effort and moral image are positively correlated. Moral image is considered to be a result of effort.

### 2.2. Effort and credit assignment

Traditional Chinese live according to the belief that human beings should emulate the law of the heavens (*tian dao*). In traditional Chinese teachings, the heavens have been constantly moving, evolving, and growing since the creation of the universe. Those who are committed to modeling their behavior after the example set by the law—improving themselves through their life pursuits—will be rewarded by the heavens. In addition, it is believed that the heavens will reward individuals in accordance with the level of effort they put forth. Those who put forth more effort deserve more credit in return. Their dreams are more likely to be realized, and they are more likely to prosper under the auspices of the heavens. This strongly-held belief is captured in an idiom that states, "The heavens will reward those who work hard." (*tian dao chou qin*). It is believed that this heavenly law is also manifested in the human sphere. The idiomatic moral principle *yi fen gengyun, yi fen shouhuo* states that the more effort one puts in, the more one should be able to harvest. In other words, the level of effort one makes is positively related to the award/credit that one receives. Thus, credit assignment is viewed as a result of effort.

Such deep-rooted ontological beliefs are reflected in current parenting and schooling practices. At home, parents are expected to instill these values into their children, and they do so by providing material, verbal, and social rewards when children exhibit diligent attitudes and behaviors. In school, teachers reinforce such beliefs through assigning credit to students for diligence, especially for academic achievement. Through this all-encompassing process of socialization, youngsters learn to internalize these effort-related cultural values through receiving credit from both parents and teachers for diligence. In this way, the positive relationship between credit assignment and effort-making is established.

### 2.3. Effort, moral image and credit assignment

As effort has a great impact on one's moral image, the moral value of effort may in turn influence the degree of credit one receives from others. Thus, in academic learning, those who study hard and succeed tend to possess a greater moral image and thus are more likely to be rewarded. In contrast, those who do not make an effort tend to be viewed as being of lower moral caliber. As a result, even when they succeed, they are less likely to receive credit. The major difference between these two groups lies in the different types of impressions they leave on others with regard to their moral character.

Those who study hard and succeed are credited because they are fulfilling their moral duty to study hard and because of the principle that "one reaps what one sows." (*yifen genyun yifen shouhuo*). These students are viewed as "model students" and described as "*pin xue jian you*" (morally sound and academically outstanding). In the eyes of the parents and teachers, they are the role models for the other students. Therefore, at home, parents tend to assign credit to their children when they work hard and achieve success. At school, teachers tend to nominate those who study hard and succeed for model student awards. Through this ever-present and all-encompassing socialization process, children learn to internalize the moral principle that they will reap what

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