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# Contents

# Verification of MPG Illusion When Fuel Efficiency Is Expressed by km/l

Atsuo Murata

Okayama University, Okayama, Japan

We conducted three questionnaire surveys to test whether people are get trapped in MPG illusion and falsely reason the reduction in gas consumption on the basis of the linear relationship between fuel efficiency and reduction in gas consumption. The MPG illusion corresponds to a cognitive bias in judging fuel efficiency when it is expressed as miles per gallon used in US. We misunderstand that the amount of gas consumed by an automobile decreases as a linear function of automobile's MPG, although the actual relationship is curvilinear. We made an attempt to confirm whether this illusion is also true for Japanese people, and it was investigated whether cross cultural difference exists in the MPG illusion (km per liter was used instead of MPG, because Japanese people are generally accustomed to not MPG but km per liter). The following findings were obtained as a result of three questionnaire surveys. The participants misunderstood that the larger change of km/l linearly led to the larger reduction in gas consumption, although the relationship is actually curvilinear. The MPG illusion was observed for both US and Japanese people, and no cross cultural difference was detected concerning this type of cognitive bias. The MPG illusion (bias) was effectively removed by replacing distance-over-volume measures such as km/l or MPG by volume-over-distance measures such as l/km or GPM.

*Keywords:* cross-cultural difference, cognitive bias, MPG, km/l, l/km, debiasing

## Introduction

Although we must make decision rationally without suffering from cognitive biases, it is difficult for us to make decision rationally and without being affected by cognitive biases (Kahneman, 2011; Tversky & Kahneman, 1974; Kahneman & Tversky, 1984; Altman, 2012; Anger, 2012; Bazerman & Moore, 2001; Murata, Nakamura, & Karwowski, 2015). Our thinking is ruled by bounded rationality, and cognitive information processing is based on either System1 or System2. System1 is simple and intuitive, operates quickly, automatically, without time consuming, and intuitively with little or no efforts. System2 requires us to conduct effortful, demanding and deliberate mental activities. When we have no time to deliberate, we tend to adopt heuristic approaches based on System1. The processing by System1 frequently suffers from cognitive biases.

Bazerman and Moore (2001) hypothesized that availability, representativeness, confirmation, or affect heuristics form the basis of a variety of biases such as availability bias, confirmation bias, hindsight bias, ignorance of base rate, conjunction fallacy, ignorance of sample size, and anchoring and adjustment. They also insisted that not only heuristics but also overconfidence and framing presumably cause a variety of biases.

Atsuo Murata, Ph.D., professor, Department of Intelligent Mechanical Systems, Graduate School of Natural Science and Technology, Okayama University.

Moreover, they assumed that our bounded awareness and uncertain situations form the basis of heuristics, overconfidence, and framing. Based on such discussion, it seems valid to judge that we sometimes can behave irrationally. In this manner, we at times show a tendency of irrational behavior. In most cases, we tend to be unaware of how irrational behaviors affect us. Such irrational properties unconsciously distort our decisions and, in the worst case, lead to undesirable events or outcomes such as incidents, collisions, disasters, or crashes as pointed out by Murata et al. (2015). Dobelli (2013) summarized 99 cognitive biases, and stated that we must recognize cognitive biases and evade them in our thinking, although cognitive biases are too engrained to rid ourselves of them completely.

Larrick and Soll (2008) reported the miles per gallon (MPG) illusion. When purchasing a car, many people consider fuel efficiency, and try to reduce gas consumption and eventually a gasoline bill. In order to reduce gas consumption, we must accurately understand what fuel efficiency such as MPG or km/l means. Larrick and Soll (2008) found that a cognitive bias occurs when judging fuel efficiency using MPG. The participants tended to misunderstand that the amount of gas consumed by an automobile decreases as a linear function of MPG, although the actual relationship is not linear but curvilinear.

We conducted three questionnaire surveys to test whether people reason in a linear, but incorrect (cognitively biased), fashion about gas consumption in a similar manner to Larrick and Soll (2008) even for fuel efficiency measure of km/l which is traditionally used in Japan. The MPG illusion corresponds to a cognitive bias in which we falsely tend to think that the amount of gas consumed by an automobile decreases as a linear function of automobile's MPG, although the actual relationship is curvilinear. In this study, an attempt was made to confirm whether this illusion is also true for Japanese participants who are accustomed to use km/l expression as fuel efficiency, and it was investigated whether cross cultural difference existed in the MPG illusion (km per liter was used instead of MPG).

## Method

### Participants

Sixty-six undergraduate students aged from 20 to 25 years old at Faculty of Engineering, Okayama University agreed to answer the three questionnaires below.

### Task and Procedure

The following three types of questionnaires were used. The unit (MPG) in Study1-Study3 conducted by Larrick and Soll (2008) was transformed to km/l, because Japanese people generally are not accustomed to the unit MPG. The same value with Larrick and Soll (2008) was used to compare the results between this study and theirs.

**Questionnaire1—Rank of reduction in gas consumption.** The participants were required to assume that a driver drives 16,090 km per year (10,000 miles per year), and is planning to change from a current vehicle to a new one. The change of km/l (MPG) from a current vehicle to a new one had the following patterns from (A) to (E): (A) 14.5 km/l (34 MPG) (current vehicle) to 21.3 km/l (50 MPG) (new vehicle), (B) 7.7 km/l (18MPG) to 11.9 km/l (28 MPG), (C) 17.9 km/l (42 MPG) to 20.4 km/l (48 MPG), (D) 6.8 km/l (16 MPG) to 8.5 km/l (20 MPG), and (E) 9.4 km/l (22 MPG) to 10.2 km/l (24 MPG). The participants were required to intuitively rank in gas savings for the patterns (A)-(E). In other words, the participants were required to evaluate which new vehicle from (A)-(E) would reduce gas consumption the most compared to the current one using a number

between 1 for the most beneficial change and 5 for the least beneficial change.

**Questionnaire2—Relationship between fuel efficiency and WTP.** The participants were required to assume that a driver drives 16,090 km per year (10,000 miles per year), and the fuel efficiency of your current vehicle, the price of which is 2,180,000 yen ($20,000), is 6.4 km/l (15 MPG). The participants were required to describe the highest price they would be willing to pay for the vehicles that differed only in fuel efficiency as follows: 7.7 km/l (19 MPG), 10.6 km/l (25 MPG), 14.0 km/l (32.5 MPG), 17.9 km/l (43.5 MPG), and 23.4 km/l (55 MPG).

**Questionnaire3—Comparison of percentage correct choice between km/l and l/km representation.** A total of 66 participants were equally allocated to Prblem3-1 (33 participants) and Problem3-2 (33 participants).

**Problem3-1.** Participants were indicated to assume that a town has two types of vehicles A and B. The fuel efficiency of Types A and B were 6.4 km/l (15 MPG) and 14.5 km/l (34 MPG), respectively. The town has 100 Type A and 100 Type B vehicles, and each car is driven 16,090 km (10,000 miles) annually. Participants were asked to intuitively choose between the following two options from the viewpoints of reduction in gas consumption.

Option1: simultaneously replace the 100 Type A vehicles with vehicles that have 8.1 km/l (19 MPG).

Option2: simultaneously replace the 100 Type B vehicles with vehicles that have 18.7 km/l (44 MPG).

**Problem3-2.** Participants were indicated to assume that a town has two types of vehicles A and B. Types A and B have 6.4 km/l (15 MPG) and 14.5 km/l (34 MPG), respectively. The town has 100 Type A and 100 Type B vehicles, and each car is driven 16,090 km (10,000 miles) annually. The difference from Problem3-1 is that the fuel efficiency was expressed in terms of l/km (gallons per 100 miles) instead of km/l (MPG). Participants were asked to intuitively choose between the following two options from the viewpoints of reduction in gas consumption.

Option1: simultaneously replace the 100 type A vehicles (0.16 l/km (6.67 gallons/100 miles)) with vehicles C that have 0.12 l/km (5.25 gallons/100 miles).

Option2: simultaneously replace the 100 type B vehicles (0.07 l/km (2.94 gallons/100 miles)) with vehicles D that have 0.05 l/km (2.27 gallons/100 miles).

## Results

### Questionnaire1—Rank of Reduction in Gas Consumption

The perceived mean rank was as follows: 34 MPG to 50 MPG (1.18), 18 MPG to 28 MPG (1.95), 42 MPG to 48 MPG (3.29), 16 MPG to 20 MPG (3.73), and 22 MPG to 24 MPG (4.86). The actual rank of Questionnaire1 was as follows: 18 MPG to 28 MPG (actual rank: 1), 16 MPG to 20 MPG (actual rank: 2), 34 MPG to 50 MPG (actual rank: 3), 22 MPG to 24 MPG (actual rank: 4), and 42 MPG to 48 MPG (actual rank: 5). The results are summarized in Table 1.

### Questionnaire2—Relationship between Fuel Efficiency and WTP

As well as the results in 3.1, mean WTP in this study and Larrick and Soll (2008) showed a clear linear relationship with km/l or MPG (see Figure 1) due to the participants' misunderstanding that the increase of fuel efficiency directly leads to the reduction in gas consumption. Participants gave mean WTP values that, compared with expected gas savings, underestimated the improvements of 7.7 km/l (19 MPG), 10.6 km/l (25 MPG), and 14.9 km/l (32.5 MPG) and overestimated the improvement of 17.9 km/l (43.5 MPG), and 23.4 km/l

(55 MPG). It must be also noted that WTP in this study was smaller that that in Larrick and Soll (2008), although WTP increased linearly as a function of fuel efficiency.

**Questionnaire3—Comparison of Percentage Correct Choice between km/l and l/km Representation**

The percentages of choice of Option1 and Option2 in Questionnaire3-1 and Questionnaire3-2 are shown in Figure 2. The percentages of choice in Questionnaire3-1 were 42% and 58% in Option1 and Optiona2, respectively. The percentages of choice in Questionnaire3-2 were 61% and 39% in Option1 and Option2, respectively. The choice of Prblem3-1 was reversed in Questionnaire3-2. Option1 is a theoretically correct one. The results show that the expression using l/km or GPM readily leads to a correct option. These results were also similar to Larrick and Soll (2008).

Table 1

*Mean Rank in Gas Saving, Actual Rank in Gas Saving, and Actual Reduction in Gas Consumption per 16,090 km (Problem1)*

| Fuel efficiency current to vehicle to new one | Mean rank | | Actual rank in gas saving | Actual reduction in gas consumption per 16,090 km (10,000 miles) |
|---|---|---|---|---|
| | This study | Larrick and Soll (2008) | | |
| 14.5 km/l→21.3 km/l (34 MPG→50 MPG) | 1.20 | 1.18 | 3 | 352.3l (94.1 gallons) |
| 7.7 km/l→11.9 km/l (18 MPG→28 MPG) | 2.14 | 1.95 | 1 | 733.4l (198.4 gallons) |
| 17.9 km/l→20.4 km/l (42 MPG→48 MPG) | 3.00 | 3.29 | 5 | 109.5l (29.8 gallons) |
| 6.8 km/l→8.5 km/l (16 MPG→20 MPG) | 3.92 | 3.73 | 2 | 470.6l (125.0 gallons) |
| 9.4 km/l→10.2 km/l (22 MPG→24 MPG) | 4.74 | 4.86 | 4 | 133.5l (37.9 gallons) |
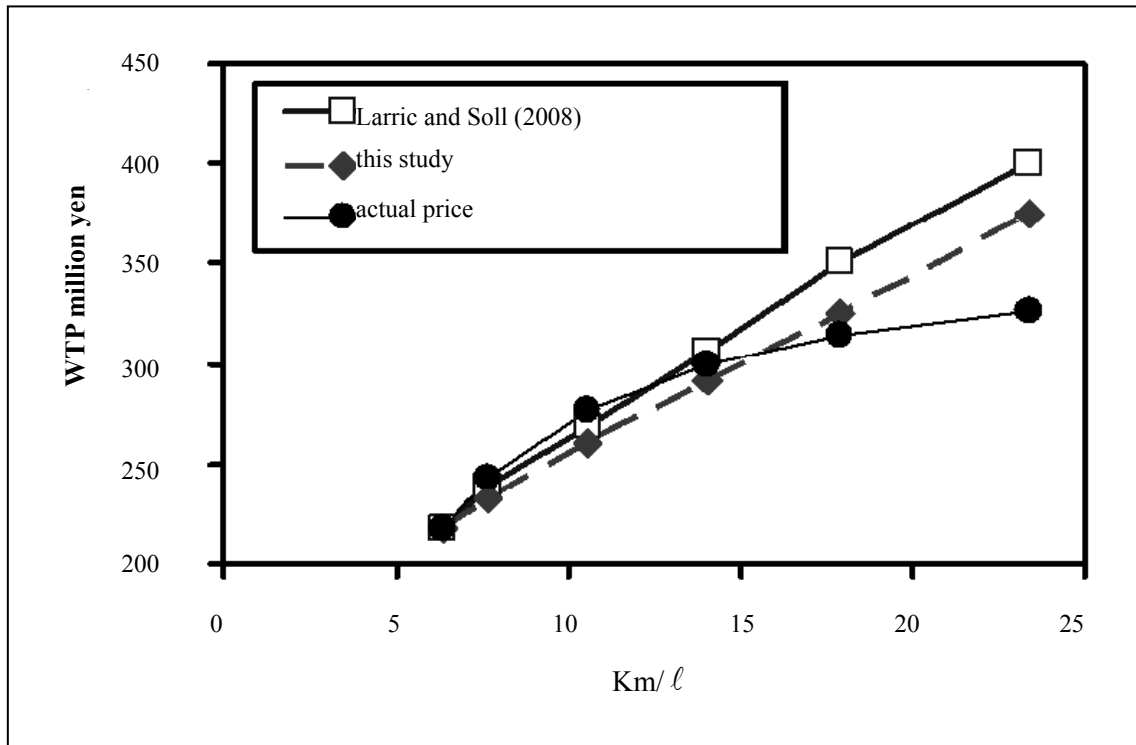


*Figure 1.* Relationship between fuel efficiency and WTP (Problem2).
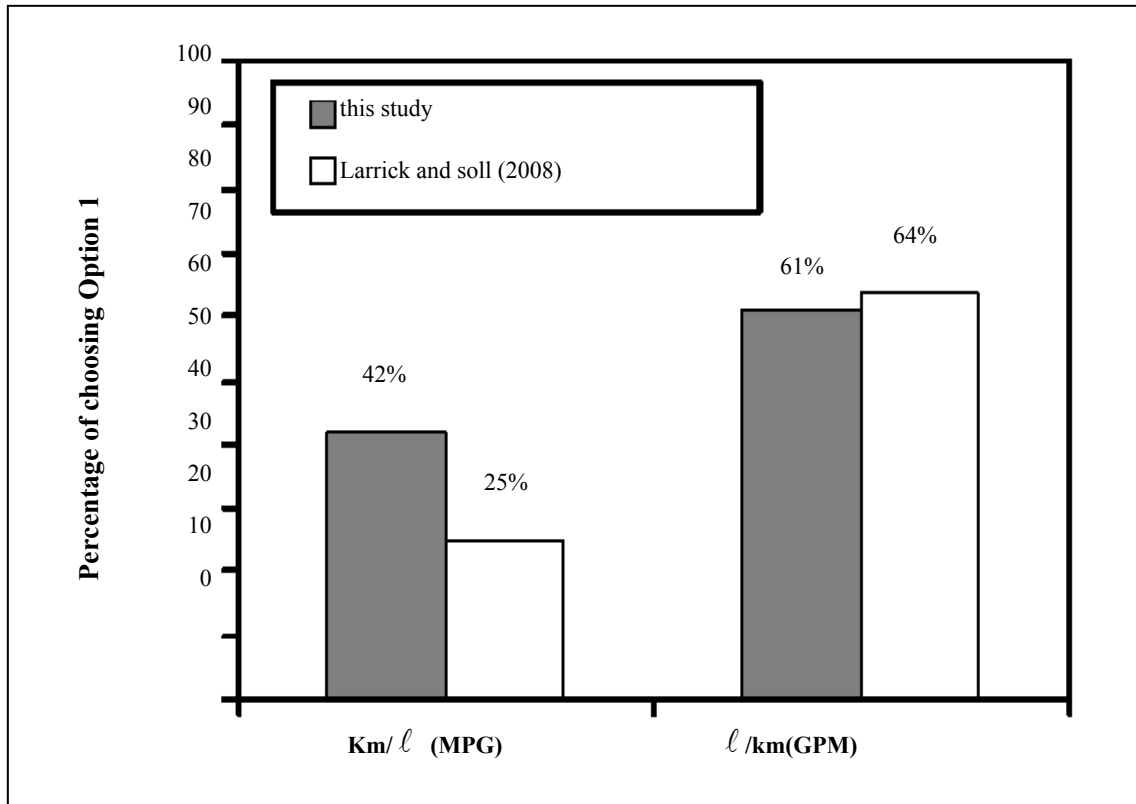
*Figure 2.* Comparison of percentage of choosing Option1 between km/l and l/km representations and between this study and Larrick and Soll (2008) (Problem3).

## Discussion

### Questionnaire1—Rank of Reduction in Gas Consumption

As shown in Table 1, the participants tend to misunderstand that the larger change in km/l linearly led to the larger reduction in gas consumption. In other words, the participants in both Larrick and Soll (2008) and this study perceived that the larger change in fuel efficiency (km/l or MPG) led to the improvement in actual reduction in gas consumption. Only 1% and 1.5% of the participants ranked according to actual improvement in gas consumption in Larrick and Soll (2008) and this study, respectively. For both cases of MPG and km/l, the participants got trapped in the MPG illusion. As in Table 1, the rank of reduction in gas consumption of this study was nearly equal to that in Larrick and Soll (2008). The results indicates that using km/l or MPG is misunderstood as representing environmental protection such as reduction in gas consumption.

### Questionnaire2—Relationship between Fuel Efficiency and WTP

Mean willingness to pay (WTP) showed a clear linear relationship with MPG improvement for both this study and Larrick and Soll (2008) (see Figure 1). The majority of participants assumed that there was a linear relationship between the km/l (MPG) improvement and WTP, although the relationship was actually nonlinear as shown in Figure 1. As a matter of fact, participants gave mean WTP values that, compared with expected gas savings expressed as vehicle price, underestimated the improvements of 7.7 km/l (19 MPG), 10.6 km/l (25 MPG), and 14.9 km/l (32.5 MPG) and overestimated the improvement of 17.9 km/l (43.5 MPG), and 23.4 km/l (55 MPG).

Comparing the difference of WTP and actual price among the conditions of fuel efficiency revealed the following results. While the smallest difference was -171,000 yen (actual price and WTP were 2,770,000 yen and 2,599,000 yen) at 10.6 km/l (25 MPG), the largest difference was 482,000 yen (3,270,000 yen and 3,752,000 yen) at 23.4 km/l (55 MPG). Although the difference of actual price between 10.6 km/l (25 MPG) and 23.4 km/l (55 MPG) was 500,000 yen, the difference of WTP between 10.6 km/l (25 MPG) and 23.4 km/l (55 MPG) was 1,150,000 yen. The results can also be explained by the misunderstanding (rather cognitive bias) that the larger change of km/l (MOG) linearly leads to the larger reduction in gas consumption.

**Questionnaire3—Comparison of Percentage Correct Choice between km/l and l/km Representation**

The results indicate that using l/km instead of km/l is effective for preventing people from being deceived by MPG illusion. The reason why the percentage choosing Option1 in Questionnaire3 was different between this study (42%) and Larrick and Soll (2008) (25%) is speculated as follows. While 171 participants in Larrick and Soll (2008) were drawn from a national subject pool, and their age ranged from 18 to 75 years old with a median age of 35, this study recruited 66 participants from students who major in engineering and are more accustomed to the treatment of calculation related to km/l.

These studies demonstrated that using km/l (MPG) as a measure of fuel efficiency caused a systematic misunderstanding about the reduction in gas consumption. Relying on linear reasoning about km/l (MPG), that is, expecting linear relationship between fuel efficiency and reduction of gas consumption leads people to misunderstand that an increase in fuel efficiency linearly leads to the reduction in gas consumption. This corresponds to linear-scaling error (bias).

The replacement of km/l by l/km is effective for deleting linear-scaling error (bias) as shown in Figure 2. The finding by Larrick and Soll (2008) was verified in this study. In other words, expression as l/km or GPM was found to be an effective debiasing method. Representing fuel efficiency in terms of volume-over-distance instead of distance-over-volume made the benefits of greater fuel efficiency more transparent.

**General Discussion**

The general finding is that there is no cross-cultural difference of MPG illusion between US and Japanese people. If the 21.3 km/l (50 MPG) fuel efficiency is used as a standard of comparison, small improvements in km/l (MPG) improvement from 6.8 km/l (16 MPG) to 8.5 km/l (20 MPG) look like leading to less reduction in gas consumption. Therefore, we tend to misunderstand that the reduction in gas consumption from 14.5 km/l (34 MPG) to 21.3 km/l (50 MPG) is larger than that from 6.8 km/l (16 MPG) to 8.5 km/l (20 MPG) (For detail, see Table 1). When translating fuel efficiency to gas consumption, we readily get trapped in MPG illusion and cannot think rationally. Consequently, the misunderstanding above occurs.

As pointed out in Section 4.3, the replacement of km/l (MPG) by l/km (GPM) is effective for mitigating the misunderstanding on the reduction of gas consumption, and participants tended to pay more attention to fuel economy information and choose fuel-efficient cars. Bazerman and Tenbrunsel (2013) also pointed out that changing the way in which information is presented works for the removal of cognitive bias. While they are using volume-over-distance measures such as l/km or GPM to express fuel economy information in Europe, Canada, and Australia, US, Japan, and other countries have yet to correct distance-over-volume measures such as km/l or MPG. This suggest that the format in which data is presented affects our decision making and potentially contributes to the removal of linear-scaling error (bias) such as MPG illusion.

Framing effect (Kahneman, 2011) is a phenomenon that a different choice or decision is obtained from the same information depending on how the information is presented to a decision maker. When the measures are expressed with a positive frame like measures A (save 200 people) and B (save 600 people with a probability of one-third), it generally tends that a majority of people choose a certain alternative A. Although measures A and B are the same as measures C (force 400 people into death) and D (save all of 600 people with a probability of one-third, and force all people into death with a probability of two-thirds), respectively, we tend to choose measure D when the measures are presented to us using a negative frame. If we can think rationally and adopt a rational alternative, we should adopt measures A and C irrespective of the type of a frame (positive or negative). However, we cannot make a rational choice. In this manner, our choice is different depending on the type of a frame even if the same information is presented to us. This indicates that we should observe and see things or events from multiple viewpoints to avoid a cognitive bias caused by framing effect. The replacement of km/l or MPG by l/km or GPM is regarded as viewing from a different frame. While the measure km/l or MPG is viewed from the frame of fuel efficiency, the measure l/km or GPM is viewed from the frame of reduction of gas consumption. The approach from a different frame contributes to the removal of MPG illusion. In this study, it was verified that viewing from multiple perspectives is helpful for avoiding a cognitive bias.

Although Todd and Gigerenzer (2000), Gigerenze, Todd, and ABC Research Group (1999), and Gigerenzer and Goldstein (1996) showed that the simple (fast and frugal) heuristics perform comparably to complex and deliberate algorithms when fast and frugal heuristics by System1 lead to robustness of thinking processes, this is not necessarily true and such heuristic frequently causes cognitive biases. Larrick (2004) described the sources of biases in decision making. He classified debiasing strategies into motivational, cognitive, and technological ones. Cognitive strategies included "consider the opposite" and training in representations. Arkes (1991) also suggested that a few general causes underlie a wide range of cognitive biases, and that recognizing the causes of biases might facilitate predicting when some debiasing strategies would be dominant. The replacement of km/l or MPG by l/km or GPM corresponds to the way in which the information is represented and consideration of the opposite, which facilitates the identification of cognitive biases, and consequently contributes to avoiding cognitive biases.

The misunderstanding (linear-scaling error (bias)) of MPG has implications for environmental decision making. As expressing fuel efficiency as km/l or MPG leads to such a cognitive bias (MPG illusion) and l/km or GPM is effective for removing such a bias, it implies that expressing fuel efficiency as both volume-over-distance measure and distance-over-volume measure is helpful. Although distance-over-volume measures such as km/l or MPG is useful for estimating the range of a car's gas tank, l/km or GPM allows us to understand exactly how much gas we are using in a given interval. Volume-over-distance measures also make the calculation of cost savings from reduced gas consumption easier.

## Conclusions

The current work has focused on the MPG illusion, meaning that we mistake the curvilinear relationship between MPG and fuel efficiency with linear relationship. The results can be summarized as follows:

(1) The participants misunderstood that the larger change of km/l linearly led to the larger reduction in gas consumption.

(2) The perceived relationship between km/l (MPG) and WTP (Willingness to Pay) was linear, while the actual relationship was curvilinear.

(3) The MPG illusion was observed for both US and Japanese people, and no cross cultural difference was detected concerning this type of cognitive bias.

(4) The MPG illusion (bias) was effectively removed by replacing distance-over-volume measures such as km/l or MPG by volume-over-distance measures such as l/km or GPM.

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# Increasing Motivation by Way of Alternative Training: Students and Lecturers Collaborate on a Dynamic Course on Developing Thinking

Mahmood Khalil, Lina Boulos, Yaser Awad

The College of Sakhnin—Academic College for Teacher Education, Sakhnin, Israel

Motivation is the level of effort expended by students in order to accomplish achievements in fields of learning they comprehend to be significant and worthwhile (Johnson & Johnson, 1985). It is therefore considered to be a crucial factor in learning. Studies have shown that motivation is divided into two types, namely, external motivation and internal motivation (Rand, 1992; Kaplan & Asor, 2001; Paulick, Retelsdrf, & Moller, 2013). The present research examined the increase in internal motivation among college students. Seventeen excellent classification female students from a college of education in northern Israel completed motivation questionnaires regarding their participation in a dynamic course, "Education for Thinking". The questionnaires were administered at two points in time—at the beginning and end of the course. In addition, the students wrote reflection reports at the two measuring points. Quantitative and qualitative analyses revealed a significant rise in internal motivation at the end of the course relative to the beginning. The source of the rise could be traced to the students' partnership spectrum in the teaching, full collaboration of the students in deciding on contents, and the use of alternative evaluation methods.

*Keywords:* motivation, developing thinking, dynamic course

## Theoretical Background

### Motivation

Motivation is a term that describes behavioral motives (Kaplan & Asor, 2001). The motivation to learn is defined as the level of effort expended by students in order to accomplish achievements in fields of learning they comprehend to be significant and worthwhile (Johnson & Johnson, 1985). In recent decades, there has been increasing recognition of the pivotal role of motivation processes in students' success in their studies and in other adaptive processes such as emotions regarding learning and school, disruptive behavior in class, coping with difficulties or failure, and well-being in general (Kaplan & Asor, 2001).

Student learning is motivated by various factors and targets, internal versus external, and immediate versus future (Paulick et al., 2013). The theory of self-direction (Ryan & Deci, 2000) distinguish between types of motivation by reasons or goals that lead to action. The most basic distinction is between intrinsic motivation and extrinsic motivation.

Mahmood Khalil, professor, President, The College of Sakhnin.
Lina Boulos, Ph.D., Excellent track head, The College of Sakhnin.
Yaser Awad, Ph.D., Coordinator of Evaluation based-School ME.d Program, The College of Sakhnin.

Internal motivation, in contrast, stems from the learner's interest in and enjoyment of what he is learning (Kaplan & Asor, 2001; Rand, 1992), and is therefore considered to be a precondition for good learning (Harpaz, 2008). In other words, internal motivation is defined as behavior that is not motivated by a clear external reinforcement, but by sharp and fun activity and by perception the activity as an opportunity to be exposed, learn and fulfill their potential (Coon & Mitterer, 2010). Behavior is motivated by internal motivation performs professional than that motivated by external motivation (Joke, Dewitte, & Lens, 2004). Despite the clear evidence that humans are endowed by a high level of internal motivational tendencies, this tendency is reflected, apparently, only under specified conditions. Studies on internal motivation emphasized the same conditions that attract, maintain, and enhance this particular kind of motivation compared to conditions that eliminate or reduce it. Social and environmental factors, interpersonal events (such as rewards, communication and feedback) that contribute to a sense of Self efficacy during action can enhance the internal motivation to action, because they provide an answer to the basic Self efficacy (Pualick et al., 2013). Feelings of Self efficacy are not increase the internal motivation if they are not accompanied by a sense of autonomy or in the focus of inside perceived causality. In other words, not enough people have experienced what they consider Self efficacy; to maintain or enhance the internal motivation, they should also experience themselves as someone who direct their behavior, means that they should have autonomy and self-control (Ryan & Deci, 2000).

Tangible rewards undermine the existence of internal motivation. In addition, threats, dictates, competitiveness and external control are weakening it. Conversely, choice, self-guidance, and internal control are strong internal motivation because they provide a sense of autonomy. The importance of autonomy versus external control of the existence of internal motivation was clearly observed in studies of classroom learning. Teachers who supports autonomy are raised in their students more internal motivation, curiosity and desire to challenge. Students overly dominated, not only lose initiative, but also to learn as well, especially when learning a complex and requires conceptual and creative process (Ryan & Deci, 2000).

Although internal motivation is clearly an important type of motivation, the motivation of most narrow sense for activities that people engage in is not internally motivated, especially after that early childhood, is an external source of motivation. External motivation relates to behaviors intended to satisfy external demand or receive an external reward. People usually experience outside regulated behavior as control or alienated behavior, and take the focus of the causality of actions designated extraneous. For external motivation there are many forms such as the seal, which is considered a form of internal regulation which is still dominated and dictated rather, because people do these activities with a sense of pressure, in order to avoid guilt or anxiety or to promote ego or pride to be provided. Although behavior regulation comes from the one him-self, imprinted behavior is fully unexperienced as part of the self, and therefore still perceived as an external control focus. Another form of external motivation is the source of regulation of identification. Here one identifies with the personal importance of behavior and therefore gets its regulatory as part from himself.

Finally, the last form of external motivation is integrated regulation. Integration occurs when the regulation identifies fully embedded into the self. This happens through self-examination and congruence between new values regulators and other needs of the ego. The more one perceives the specific reasons for the action and incorporates them into the self, so the actions which he performs thru external motivation, are done by increasing of self-direction.

Integrated forms of motivation are similar in many aspects of internal motivation, but they are still external because even behavior conduct from integrative regulation is done with the perception of the

benefit—result of any distinct from the behavior itself (Pualick et al., 2013). Research findings expanded the types of external motivation, have shown a relationship between more external motivation and between increasing involvement, improved performance, less dropout rates and higher quality learning. As behaviors are based on external motivation are inherently interesting, the main reason people are expected to agree to perform these behaviors is due to the appreciation from the people that are important for them and they feel a connection to them. In the theory of self-direction above description called belonging. This means that school pupils willingness to accept the proposed values depend on their sentiment whether the teacher respect and care about them (Ryan & Deci, 2000).

The distinction between external and internal motivation is related to people's behavior. When behaviors motivated by external factors such as reward, press, and grade, they behave or learn to get the reward or avoid punishment. However, when people are motivated by internal motivation, they feel free to follow their internal interest, and have free participation in activities (Ryan & Deci, 2000). In other words, participation in activities arises from free selection and willing. The difference between learners who are motivated internally and externally are that learners with internal motivation is more interested, personal security, excitement, perseverance, a good performance and show a better understanding of the task than those who are motivated by external motivation (Pualick et al., 2013).

It is customary to characterize motivation in the framework of what is called the quantitative view of motivation (Ames, 1990; Ames & Ames, 1984; Maher & Midgley, 1991), which decrees that there are three measures for motivational behavior: (1) direction—this refers to the choice an individual makes when he is the performer of a single activity and no other, when he perseveres with a particular activity even when difficulties arise or other alternatives present themselves, or when he continues with a particular activity even when he is not required to do so; (2) intensity—this is the level of effort the individual expends on the activity—high or low; and (3) quality—the quality of the activity also distinguishes among behaviors with a different motivational character—problem-solving by means of novel methods versus hard work employing an unsuccessful strategy; deep, critical thinking that provokes incisive questions versus a safe path toward the desired grade.

Lately, motivation researchers have begun to add to the quality measure an emphasis on the pupil's psychological experience: his emotions with regard to the activities in which he is involved, his feelings toward learning and school in general, and his self-evaluation (Kaplan & Asor, 2001).

Bloom (1976) contended that there is a difference between individuals with respect to their emotional willingness to learn, as expressed in their interest, attitudes and view of themselves. When students approach learning tasks with enthusiasm and interest, their learning will be easier and, all other factors being equal, they will learn faster; their achievements will be greater than those of students who approach the task with a noticeable lack of enthusiasm and interest. The research demonstrates that the emotional characteristics and motivation are important for determining or influencing the pupil's achievements (Lalonde & Gardner, 1993).

The motivation theories offer explanations for the processes that induce students to choose, persevere, and expend an effort in their studies as well as in social involvement and helping others; however, despite the fact that numerous theories from different fields (philosophy, psychology, neurobiology) have attempted to explain the phenomenon of motivation, no theory that embraces all the complex processes of which it is composed can be found. In addition, differences between definitions of the motivational terms make it difficult to transfer the understanding achieved in one theoretical framework to the advancement of the understanding of the motivational processes dealt with by another theory. Many researchers have expressed dissatisfaction with this

situation, in which motivation theories do not contribute to the development of a coherent body of knowledge (Kaplan & Asor, 2001).

One of the theories that attempted to clarify motivation is Maslow's (1954) humanistic theory, which stresses the meaning of behavior for the individual and claims that the source of motivation resides in his innate needs. This theory gave rise to the Self-Determination Theory (Deci, Vallerand, Pelletier, & Ryan, 1991), which foregrounds the individual's universal tendency to develop his hidden potential and realize his authentic self. This theory postulates that there are three basic innate needs that constitute the basis of an individual's behavior:

(1) The need for autonomy: This is the individual's need to feel that his behavior is not imposed on him, but rather stems from him and expresses his authentic needs and tendencies;

(2) The need for ability: This is the individual's need to feel that he has the ability and the capacity to accomplish objectives that are difficult to accomplish;

(3) The need for contact and belonging: This is the individual's need to love other people and be loved by them, to be profoundly connected to those people, as well as the need to be a part of a bigger community.

In contrast, other theories, such as the one that deals with self-efficacy, or the theory of the aims of achievement (Bandura, 1977) emphasize socio-cognitive processes that focus on the individual's subjective perceptions of himself and his surroundings, and that are constructed from the interaction with those around him. Self-efficacy is the individual's perception of himself as successfully accomplishing the task facing him. Studies show that a high perception of self-efficacy in relation to some kind of task reinforces the tendency to select the task, persist in carrying it out even when difficulties are encountered, accomplish it well, and evaluate it as important and enjoyable.

The concept of the perception of self-efficacy constitutes one of the central pillars in the development of the theoretical approach to motivation that is called the "cognitive-social approach". This approach is based on the assumption that the individual's behavior is mediated by cognitive processes, and that these processes develop during social interaction. The basic assumptions of this approach state that the environment, the cognitive processes that occur in the individual and the individual's behavior all exert an influence on one another (Bandura, 1986).

The teaching policy and the curriculum both influence the student's motivation (Bloom, 1976). The student's motivation level is a function of the degree of correlation between his "motivation type" and the customary teaching methods in his class. Thus, for instance, the use of the Internet, computer programs and group work were found to increase interest, enjoyment, and motivation among students studying science (Butler & Lumpe, 2008; Mistler-Jackson & Songer, 2000).

Evaluation in the school also exerts a significant motivational influence (Nisan, 1980). However, while the traditional examinations mainly affect external motivation (Rand, 1992), evaluation by means of portfolios leads to an increase in the students' internal motivation (Kaplan & Asor, 2001; Mitchell, 1992; Rozner, 1998; Shulman, 1992). It seems, therefore, that above all, what is required in order to occasion the serious application of the body of motivational knowledge is a change in priorities: from an emphasis on achievement measured by comparative grades to in-depth learning that is motivated by quality motivation and by the student's maximum emotional and social development (Kaplan & Asor, 2001) that must necessarily involve the students in processes of planning, execution, reflection and evaluation—in short, their involvement in decision-making regarding their studies.

**Students' Involvement in Decision-Making Regarding Their Studies**

Teacher education programs constitute the key to developing positive learning environments (Rideout, 2006). It is desirable for such programs to assist in examining novice teachers' attitudes and perceptions regarding education—among other things, how research findings can help them understand teaching—learning situations in the classroom, link them to personal experiences, and examine the various existing attitudes with reference to the learning environment in which they will work in the future (Khalil & Saar, 2009). Thus, collaboration between teachers and their students may well nurture a positive, constructive and motivational learning environment.

While Harpaz (2008) claimed that the first and most basic step in fostering learners' thinking is to involve them in thinking about the topics studied, in reality, very little has been written about the involvement of students in the planning, execution and evaluation processes of courses. Research in this field is rare, with the exception of studies examining students' involvement in the research, where it was proved that such involvement serves as a tool for increasing motivation and improving the school climate (Khalil & Saar, 2009).

Even in cases where the collaboration between teacher and students is not full, the study showed that a learning environment that grants the students autonomy in the choice of activities they wish to perform is likely to raise their level of motivation and cognitive involvement (Hanrahan, 1998). Henderson, Fisher, and Fraser (2000) also found that when the teacher demonstrates leadership in the classroom and accords the students responsibility and freedom of action, there is an increase in their academic achievements.

It would appear that the way to improve the students' academic achievements is to change the existing learning environment and adapt it as much as possible to the environment as the students perceive it (Fraser, 1998; Fraser & Aldridge, 2002), namely, an environment that includes them, takes their wishes, interests and choices into account, and does not impose a sole "modus operandi" on them from above.

Thus, a positive learning environment emerges: the students' participation in decision-making regarding their studies, autonomy in choosing the activities they wish to perform, responsibility and freedom of action, and involvement in course planning processes, in execution and in evaluation are all likely to constitute sources of motivational stimuli in the learning process. A new course at Sakhnin College on the topic, "Education for Thinking", was planned in a manner that included dynamic processes that would make the students partners in its planning, learning, teaching and evaluation. It would also grant them autonomy in choice of contents and accord them responsibility and freedom of action while they scoured the literature for sources of knowledge relevant to the topics studied in the course.

## Research Questions and Hypotheses

The main question underlying the present research relates to the influence of the course, "Education for Thinking", on the participants' level of motivation to learn. The research will examine their level of motivation both at the beginning of the course (henceforth, the "before" situation) and at the end of the course (henceforth, the "after" situation).

**Research Question**

Will differences be found (1) in the level of motivation of the students who participated in the course, "Education for Thinking", and (2) between the level of motivation at the beginning of the course (namely, "before") and the level of motivation at the end of the course (namely, "after")?

**Methodology**

The study is an integrated paradigm (Mixed Method) the quantitative research (questionnaire given to students) and qualitative research (personal Diary). Using this paradigm stems from the fact that we need a quantitative approach to population anonymous, and a qualitative approach to strengthen the quantitative findings (Shkedi, 2003). The method combines a qualitative and quantitative research tools. This combination enables a highly credible research by using different research methods in the various study stages (Tashakkor & Teddie, 2003).

**Research Subjects**

Seventeen first- or second-year students from a college of education in northern Israel participated in the research. The students are studying in various tracks in the college: early childhood, special education, and middle school English.

In addition to their studies in the regular tracks, the students also study in the Excellence track, which offers these population unique courses. The students are accepted to this track on the basis of stringent acceptance requirements that included high grades in their matriculation and psychometric examinations.

**Research Tools**

The research employs a combination of tools for checking motivation. In order to validate the findings, a quantitative tool—namely, a closed quantitative questionnaire—was used, as was a qualitative tool—namely, reflection reports. The tools are described in detail below:

(1) The first tool with which motivation was measured was a closed questionnaire administered before and after the course in the "before" and "after" situations. The questionnaire, which was based on the motivation questionnaire described in Khalil's (2001) study, included 14 statements on a Likert scale of 1-5 levels (1—"Not true at all", 2—"Not true", 3—"I'm not sure", 4—"True", 5—"Very true"), so that 1 symbolizes low motivation and 5 symbolizes high motivation.

The questionnaire was based on the following nine categories:

(a) Homework;

(b) Attendance;

(c) Achievement orientation;

(d) Listening to others in the lesson;

(e) Expanding horizons and curiosity;

(f) Interaction with the teacher;

(g) Active participation;

(h) Desire and "appetite" for devoting more time;

(i) Enjoyment.

Its validity and reliability were checked in Khalil's (2001) study, which reported a reasonable Cronbach alpha value 0.79.

Items 6 and 13 were negative expressions, so that a low response to them indicated high motivation, while a response with a high value indicated low motivation. Furthermore, in order to match the questionnaire fully to the needs of the course, "Education for Thinking", some of the items were reprocessed, and, at the end of the processing of the questionnaire, were validated by two judges who were content experts in the field.

(2) The second tool used to measure the level of motivation to learn consisted of reflection reports by means of which the students related to several course components. Two reports were written—one at the beginning "before" and one at the end of the course "after". Qualitative analyses were performed in order to examine the level of motivation to learn that was expressed in the two sets of reports.

**Research Procedure**

The research was conducted at the college during the course, "Education for Thinking", and comprised two stages. The first stage took place toward the beginning of the course. The subjects responded to the motivation questionnaire anonymously and repeated the procedure at the second stage, which occurred at the end of the course. The conditions under which the questionnaire was administered were identical for both stages. In addition, the students wrote reflection reports in which they related to emotions, fears and worries, assignments, methods and ways of teaching, evaluation and motivation. The reports were written both at the beginning and end of the course.

## Results

The items on the questionnaire describe a range of situations in the educational climate—external stimuli (for instance, "I use the library to learn more about this topic"), and feelings—internal stimuli (for instance, "I don't feel tired or bored during the lesson on this topic"). The first administration of the questionnaire in the "before" situation produced a Cronbach alpha reliability value of 0.69. A factor analysis of motivation grades revealed that only the first factor had conceptual meaning in according to the items that contained them. Seven of the 14 items on the questionnaire were found to be dominant (the loadings of the items in according to the factor was higher than 0.5). After the elimination of the other items, the Cronbach alpha value was 0.84. A factor analysis of the seven dominant items was performed, yielding two factors. The first factor, which included three items, reflected an external motivation stimulus. The three items (items 4, 10 and 14 respectively on the questionnaire) were: (1) "I learn a great deal from the discussions and from my peers' questions and answers during the lesson"; (2) "In order to learn more about the topic, I use databanks, either computerized or non-computerized"; and (3) "I like the variety of teaching methods for this topic". The second factor included four items (items 1, 6, 11 and 12 respectively on the questionnaire) and reflected an internal motivation stimulus, as follows: (1) "I do the homework and assignments for 'Education for Thinking' with a feeling of enjoyment and fun"; (2) "I don't feel tired or bored during the lesson on this topic"; (3) "I have a growing interest and desire to continue studying the topic"; and (4) "I wish there were more lessons on this topic".

The Cronbach alpha reliability value of the motivation grades at the end of the course was 0.55. A factor analysis of the motivation grades revealed that only the first factor had conceptual meaning in according to the items that contained them. Seven dominant items were found out of the 14 on the questionnaire. After the elimination of the other items, the Cronbach alpha value was 0.74. A factor analysis of the seven dominant items was performed, yielding two factors. The first factor, which included two items, reflected an external motivation stimulus. The two items (items 7 and 10 respectively on the questionnaire) were: (1) "I initiate conversations on the topic with the lecturers after the lesson"; and (2) "In order to learn more about the topic, I use databanks, either computerized or non-computerized". The second factor included five items (items 3, 6, 9, 11 and 12 respectively on the questionnaire) and reflected an internal motivation stimulus, as follows: (1) "I

make an effort to improve my achievements in this topic"; (2) "I don't feel tired or bored during the lesson on this topic"; (3) "I love participating in this lesson"; (4) "I have a growing interest and desire to continue studying the topic"; and (5) "I wish there were more lessons on this topic".

It transpires, therefore, that not only is there a difference in the sources of motivational stimulus among the students between those identified at the beginning and those identified at the end of the course, but also that there are four common and dominant items (items 6, 10, 11, and 12 respectively on the questionnaire) at the beginning and end of the course, namely: (1) "I don't feel tired or bored during the lesson on this topic"; (2) "In order to learn more about the topic, I use databanks, either computerized or non-computerized"; (3) "I have a growing interest and desire to continue studying the topic"; and (4) "I wish there were more lessons on this topic". The Cronbach alpha reliability value for the grades of the common items was 0.66. The four items described an emotional and feeling-based dimension in that the students did not feel tired or bored during the lesson in the course, "Education for Thinking". Moreover, they reported increasing interest and desire to continue studying the course topic, requested additional lessons, and devoted time and thought to actively researching the topic in computerized or non-computerized databanks. In other words, during the course, a motivational process that was nurtured by two sources of stimuli—the first external and the second internal—was generated. The two sources foreground the importance of an environment that involves the students, expresses their desires and choices, and does not impose a sole "modus operandi" on them.

In order to hone the differences in the students' performances on the motivation examinations, we change the ranks of the scale from five to three; that is, we re-ranked the students' answers so that answers 1 and 2 symbolized a low level of motivation, answer 3 symbolized a medium level of motivation, and finally answers 4 and 5 symbolized a high level of motivation.

In accordance with the dominant items on the motivation examination that were identified in the "before" situation, the findings show that the source of the main improvement in the percentage of students who reported a rise in the level of motivation resided in items indicating an internal motivation stimulus. Table 1 shows that there was a 30.2% increase in the percentage of students who reported an improvement in the level of motivation between the "before" and "after" situations as regards the "Education for Thinking" course. This increase in percentage is divided according to two sources: external and internal. While the increase in the percentage of students who reported a rise in the level of motivation as a result of external stimuli (items 4, 10 and 14) was 17.6% on average, the percentage of students who reported such a rise as a result of internal stimuli (items 1, 6, 11 and 12) was 39.7% on average. Furthermore, some 48.7% of the students reported a high and consistent level of motivation in both the "before" and "after" situations.

In order to examine the significance of the influence of the course, "Education for Thinking", on the students' level of motivation, we defined the extent and depth of the change in level of motivation in the following manner: Every student completed a questionnaire comprising 14 items (dimension and depth), and every item was marked by 17 students (dimension and extent). It transpired: therefore, that 238 two-dimensional reference points (depth and extent)—the product of the number of observations and the number of items—could be obtained. Since the number of dominant items in the "before" situation was seven, it turns out that the total number of dominant two-dimensional reference points is 119. Based on this, a two-dimensional summary is presented in Table 2.

Table 1

*Change in the Percentage of Students According to the Change in Level of Motivation to Learn Based on the Direction of the Change from "Before" to "After"(Dominant Items—"Before")*

| Level of motivation "before" | Level of motivation "after" | | | | |
|---|---|---|---|---|---|
| | Deterioration | No change | | | Improvement |
| Item number | | Low | Medium | High | |
| 1. I do the homework and assignments for "Education for Thinking" with a feeling of enjoyment and fun | 11.8 | 0 | 0 | 64.7 | 23.5 |
| 4. I learn a great deal from the discussions and from my peers' questions and answers during the lesson | 0 | 0 | 0 | 94.1 | 5.9 |
| 6. I don't feel tired or bored during the lesson on this topic | 23.5 | 0 | 0 | 35.3 | 41.2 |
| 10. In order to learn more about the topic, I use databanks, either computerized or non-computerized | 29.4 | 0 | 11.8 | 29.4 | 29.4 |
| 11. I have a growing interest and desire to continue studying the topic | 29.4 | 0 | 0 | 35.3 | 35.3 |
| 12. I wish there were more lessons on this topic | 17.6 | 0 | 11.8 | 11.8 | 58.8 |
| 14. I like the variety of teaching methods for this topic | 11.8 | 0 | 0 | 70.6 | 17.6 |
| General average | 17.6 | 0.0 | 3.4 | 48.7 | 30.2 |

Table 2

*Change (in Extent and Depth) in the Percentages of Students According to the Change in Level of Motivation (Dominant Items—"Before")*

| Level of motivation | | Level of motivation "after" | | | |
|---|---|---|---|---|---|
| | | Low | Medium | High | Total |
| Level of motivation "before" | Low | 0.0 | 2.5 | 9.2 | 11.8 |
| | Medium | 0.8 | 3.4 | 18.5 | 22.7 |
| | High | 3.4 | 13.4 | 48.7 | 65.5 |
| | Total | 4.2 | 19.3 | 76.5 | 100.0 |

Table 2 shows that the percentage of students who reported an increase (from a low to a medium or high level (11.7%) and then from a medium to a high level (18.5%)) in the extent and depth of level of motivation was 30.2% as opposed to a decrease of 17.6% (from a high level to a medium or low level (16.8%) and then from a medium to a low level (0.8%)). The test of a hypotheses for equality of proportions (between increase and decrease proportions) exhibited a significant improvement in the extent and depth of the level of motivation ($P$-value = 0.011) at a significance level of 0.05.

In addition, the findings show that the main improvement in the percentage of students who reported an increase in the level of motivation to learn, when the level of motivation is analyzed in accordance with the dominant items of the "after" situation, is found particularly in the items that indicate an external motivational stimulus. Table 3 shows that there was a 32.8% increase among the students who reported an improvement in level of motivation between the "before" and the "after" situations, according to the dominant items of the "after" situation. While the increase in the percentage of students who reported an increase in the level of motivation to learn as a result of external stimuli (items 7 and 10) was 35.2% on average, the percentage of students who reported an increase in the level of motivation caused by internal stimuli (items 3, 6, 9, 11 and 12) was 31.8% on average. Furthermore, some 37.8% of the students reported a high and consistent level of motivation to learn both in the "before" and in the "after" situations.

Table 3

*Change in the Percentage of Students According to the Change in the Level of Motivation to Learn Based on the Direction of the Change from "Before" to "After" (Dominant Items—"After")*

| Level of motivation "before" | Level of motivation "after" | | | | |
|---|---|---|---|---|---|
| | Deterioration | No change | | | Improvement |
| Item number | | Low | Medium | High | |
| 3. I make an effort to improve my achievements in this topic | 0 | 0 | 5.9 | 94.1 | 0 |
| 6. I don't feel tired or bored during the lesson on this topic | 23.5 | 0 | 0 | 35.3 | 41.2 |
| 7. I initiate conversations on the topic with the lecturers after the lesson | 41.2 | 5.9 | 5.9 | 5.9 | 41.1 |
| 9. I love participating in this lesson | 23.5 | 0 | 0 | 52.9 | 23.5 |
| 10. In order to learn more about the topic, I use databanks, either computerized or non-computerized | 29.4 | 0 | 11.8 | 29.4 | 29.4 |
| 11. I have a growing interest and desire to continue studying the topic | 29.4 | 0 | 0 | 35.3 | 35.3 |
| 12. I wish there were more lessons on this topic | 17.6 | 0 | 11.8 | 11.8 | 58.8 |
| General average | 23.5 | 0.8 | 5.1 | 37.8 | 32.8 |

As previously, the influence of the course, "Education for Thinking", on the extent and depth of the students' level of motivation was examined using the same method. Thus, the total number of two-dimensional reference points in this case is 119.

Table 4

*Change (in Extent and Depth) in the Percentages of Students According to the Change in Level of Motivation (Dominant Items—"After")*

| Level of motivation | | Level of motivation "after" | | | |
|---|---|---|---|---|---|
| | | Low | Medium | High | Total |
| Level of motivation "before" | Low | 0.8 | 5.0 | 9.2 | 15.1 |
| | Medium | 0.8 | 5.0 | 18.5 | 24.4 |
| | High | 6.7 | 16.0 | 37.8 | 60.5 |
| | Total | 8.4 | 26.1 | 65.5 | 100.0 |

Table 4 shows that the percentage of students who reported an improvement (a transition from a low to a medium or high level (14.2%) and another transition from a medium to a high level (18.5%)) in the extent and depth of the level of motivation to learn was 32.8% as opposed to a deterioration of 23.5% (a transition from a high level to a medium or low level (22.7%) and another transition from a medium to a low level (0.8%)). The improvement in the extent and depth of the level of motivation in accordance with the students' reports was found to be significant ($P$-value = 0.056) at a significance level of 0.06.

With reference to the shared dominant items (dominant in both "before" and "after" situations, namely, items 6, 10, 11 and 12), Table 5 shows that there was an increase of 41.2% among students who reported an improvement in the level of motivation to learn between the "before" situation and the "after" situation.

Table 5

*Change in the Percentage of Students According to the Change in the Level of Motivation to Learn Based on the Direction of the Change from "Before" to "After" (Dominant Items—"Shared")*

| Level of motivation "before" | Level of motivation "after" | | | | |
|---|---|---|---|---|---|
| | Deterioration | No change | | | Improvement |
| Item number | | Low | Medium | High | |
| 6. I don't feel tired or bored during the lesson on this topic | 23.5 | 0 | 0 | 35.3 | 41.2 |
| 10. In order to learn more about the topic, I use databanks, either computerized or non-computerized | 29.4 | 0 | 11.8 | 29.4 | 29.4 |
| 11. I have a growing interest and desire to continue studying the topic | 29.4 | 0 | 0 | 35.3 | 35.3 |
| 12. I wish there were more lessons on this topic | 17.6 | 0 | 11.8 | 11.8 | 58.8 |
| General average | 25.0 | 0.8 | 5.9 | 28.0 | 41.2 |

As previously, the influence of the course, "Education for Thinking", on the extent and depth of the students' level of motivation was examined using the same method. Thus, the total number of two-dimensional reference points in this case is 68.

Table 6

*Change (in Extent and Depth) in the Percentages of Students According to the Change in Level of Motivation (Dominant Items—"Shared")*

| Level of motivation | | Level of motivation "after" | | | |
|---|---|---|---|---|---|
| | | Low | Medium | High | Total |
| Level of motivation "before" | Low | 0.0 | 4.4 | 11.8 | 16.2 |
| | Medium | 0.0 | 5.9 | 25.0 | 30.9 |
| | High | 7.4 | 17.6 | 27.9 | 52.9 |
| | Total | 7.4 | 27.9 | 64.7 | 100.0 |

Table 6 shows that the percentage of students who reported an improvement (a transition from a low level to a medium or high level (16.2%) and a transition from a medium level to a high level (25.0%)) in the extent and depth of the level of motivation to learn was 41.2% as opposed to a deterioration of 25.0% (a transition from a high level to a medium or low level (25.0%) and another transition from a medium to a low level (0.0%)). The improvement in the extent and depth of the level of motivation was found to be significant ($P$-value = 0.023) at a significance level of 0.05.

**Cluster Identification**

In order to check the common type of subjects' reactions both at the beginning and at the end of the course, a cluster analysis was performed on the questionnaires. According to this analytical method, the diversity within the clusters is reduced to the minimum and the diversity between them is increased to the maximum. This method is based on a predetermined number of clusters. In order to determine the clusters, two statistical methods were employed:

**K-means cluster analysis.** This method enables clusters of homogeneous items to be identified in relation to their characteristics—in our case, in relation to the 14 items. The algorithm in this method calculates the average square of the simple Euclidean distance between the items in order to determine the order of the members of the different clusters.

**Hierarchical cluster analysis.** In contrast to the first method, the algorithm in this method calculates the distance between two clusters according to Ward's distance. This method is more solid than the first.

In both methods, identical clusters were found. Moreover, in accordance with the profiles of the clusters according to both methods (a) and (b), dominant profiles among the subjects can be characterized relatively easily.

It was found that the common profile of the students according to the questionnaire that was administered at the beginning of the course, and the students gave a high ranking to the items with high significant according to there opinions, was expressed by the following items : "I try not to be late for this lesson or miss it"; "I make an effort to improve my achievements in this topic"; "I like the lecturers' method of teaching the topic"; "I learn a great deal from the discussions and from my peers' questions and answers during the lesson"; "I like the variety of teaching methods for this topic"; "I use the library to learn more about this topic"; "In order to learn more about the topic, I use databanks, either computerized or non-computerized"; and "I have a growing interest and desire to continue studying the topic". The students gave the rest of the items a low ranking: "I don't feel tired or bored during the lesson on this topic"; "I wish there were more lessons on this topic"; and "I don't devote enough time to the demands of the topic". This common profile, which characterizes 53.0% of the general profiles, supports the explanations and validates the reliability analysis of the Cronbach alpha measure. In other words, the students complained about the fact that the course was being held during the summer vacation since most of them had planned to work in order to finance their studies. In addition, they were bothered by the intensity of the course because it encroached on the amount of time available to them, and also, perhaps, by the issue of achievement orientation, which was important to them since they came from the Excellence track.

The common profile of the students according to the questionnaire that was administered at the end of the course, and the students gave a high ranking to the items with high significant according to there opinions, was expressed by the following items: "I do the homework and assignments with a feeling of enjoyment and fun"; "I learn a great deal from the discussions and from my peers' questions and answers during the lesson"; "I like the lecturers' method of teaching the topic"; "I like the variety of teaching methods for this topic"; "I try not to be late for this lesson or miss it"; "I make an effort to improve my achievements in this topic"; "I use the library to learn more about this topic"; and "I have a growing interest and desire to continue studying the topic". The students gave the rest of the items a low ranking: "I feel tired or bored during the lesson on this topic"; and "I don't devote enough time to the demands of the topic".

Thus, even in the cluster analysis, it was found that the properties of the dominant profile corresponded with and supported the findings of the previous analyses, showing that the high motivation stemmed from both external and internal sources.

An analysis of the students' level of motivation according to the qualitative research tool was also performed. The qualitative tool for checking it consisted of reflection reports that the students were requested to write at the beginning and end of the course. These reports were analyzed in accordance with the nine categories relevant to motivation, as expressed in Khalil's (2001) research, and in accordance with the questionnaire for checking motivation that was distributed to the students before and after the course. The categories are as follows: homework, attendance, achievement orientation, listening to others in the lesson, expanding horizons, interaction with the teacher, active participation, desire and "appetite" for devoting more time, and enjoyment.

From the analyses of the reports written at the beginning of the course, it transpires that most of the students related to the categories expressing attendance, achievement orientation, desire and appetite, enjoyment, interaction with the teacher, curiosity, and active participation. This was reflected in the manner in which their anxieties and uncertainty were dispelled in the first lesson thanks to the preliminary explanation of the course procedure, which the lecturer described clearly and comprehensibly—something that appealed to them. They were given the impression that the course would be taught in a new and unconventional format. Moreover, the students related to the unsuitable scheduling of the course and to their fears of low achievements—particularly in the light of their membership of the Excellence track.

From the analysis of the reports written at the end of the course, it transpires that most of the students related to the categories expressing listening to others in the lesson, active participation, interaction with the teacher, the desire to expand horizons, curiosity, enjoyment, and the desire and appetite for devoting more time. They lauded the open discussions and the many questions that arose during their studies, the lecturers' unique teaching method, and particularly the variety of teaching methods employed during the course. Furthermore, they stressed the claim that the success of the course was inextricably linked to the lecturer's skills and qualifications, which were prerequisites for success.

The issue of the course syllabus as prepared by the students was mentioned frequently as a new and interesting method, and this compelled them to make every effort to find materials accordingly. In addition, while most of them expressed their desire to continue studying the topic of education for thinking, they complained that too little time had been allotted to the course, and claimed that a request to schedule more time was justified. Moreover, they expressed interest in the lesson procedure and did not feel fatigued.

While the reflection reports from the initial stage of the course expressed curiosity about the course on the one hand and the anxieties relating to the future contents of the course on the other, the reports from the end of the course contained insights and references to the learning and teaching process in it.

It is important to mention that there was a fitness between the findings of the reflection reports and the analyses of the motivation questionnaires, and this led to an improvement in the percentage of students who gave the following statements a high ranking at the end of the course: "I don't feel tired or bored during the lesson on this topic"; "I love participating in this lesson; In order to learn more about the topic, I use databanks, either computerized or non-computerized"; "I have a growing interest and desire to continue studying the topic"; and "I wish there were more lessons on this topic". Similarly, in their reflection reports, the students related to the same contents of the dominant statements as in the motivation questionnaire.

## Discussion

The planning of the studies in the courses taught at colleges of education is not always in line with the students' needs, inclinations and academic and affective interest (Lazarowitz, 2000). The present study focused on a new college course on education for thinking—a course that included dynamic processes involved in planning, learning, teaching and evaluation. The research aim was to examine the effect of these dynamic processes from focal points of formative evaluation on the students' level of motivation.

In order to investigate the effect of this unique course on the participants' level of motivation, the students were examined at two points in time: at the beginning and end of the course. At both times, the students completed motivation questionnaires and wrote reflection reports.

Students' motivation to learn is of crucial importance in their learning process. Motivation is so important

that it can be compared to a generator—a power producer, to a starter—an action initiator, and to a steering wheel—a motion director. Lam (1999) maintained the crucial factor in learning to be neither the intellect nor the didactic method, even though both of them play a part in it, but rather motivation. The results obtained from this research indicate a clear increase in the participants' level of motivation in the course, "Education for Thinking". This finding emerges from the two research tools: the motivation questionnaires and the reflection reports.

The analysis of the findings demonstrates that a rise in the level of motivation occurred, resulting in higher grades on the motivation questionnaires (extent and depth) administered at the end of the course than on those administered at the beginning of it. A similar trend is revealed by the analyses of the students' reflection reports. These analyses show that at the end of the course, the participants' level of motivation was higher than it had been at the beginning.

## Discussion of the Findings from the Motivation Questionnaires

The discussion will relate to motivation in general with two measurements performed at different points in time in such a way that the first measurement extended from the beginning to the end of the course with the point of reference being the beginning of the course. The second measurement was performed at the end of the course.

The findings show that motivation can be divided into two types: internal motivation and external motivation, both at the beginning and at the end of the course. Internal motivation is manifested in inner responsibility, feelings, desires, emotions and the evaluation of abilities. External motivation is reflected in the relationship with the teachers, teaching methods, use of teaching aids, varied contents, characteristics of the students in the class, course length, scheduling of the course—in other words, the educational climate and environment. Distinction between the sources of motivation discussed extensively in the literature (Paulck et al., 2013).

An improvement in the general (internal and external) motivation grades was observed toward the end of the course. The rise in general motivation stems principally from the rise in the internal motivation that was observed toward the end of the course. This rise was reflected in doing homework and assignments with a feeling of enjoyment, the inclination to engage in in-depth learning, and the increased desire to participate in more lessons. These data are found to correspond with Bloom's (1976) claim that learning accompanied by enthusiasm and interest is more challenging than learning without enthusiasm (Joke, Dewitte, & Lens, 2004). Similarly, Kaplan and Asor (2001) claimed that the learner's positive emotions and feelings regarding school as well as his self-evaluation contribute to the dimension of quality in motivational behavior (Ames & Ames, 1984; Ames, 1990; Maher & Midgley, 1991; Coon & Mitterer, 2010).

The measurement performed at the second point in time, namely, at the end of the course, revealed a significant improvement in the general (internal and external) motivation grades. The rise in general motivation stems mainly from the rise in external motivation, which was measured at the end of the course. This rise is attributable to the supportive atmosphere, the initiation of conversations on the topic with the lecturers (Pualick et al., 2013), the judicious use of computerized and non-computerized databanks, full partnership in decision-making, and participation in deciding on contents, evaluation and assignments. These findings correspond with those of Kaplan and Asor (2001), who claimed that in-depth learning that is motivated by quality motivation and by the student's maximum emotional and social development must necessarily involve

the students in processes of planning, execution, reflection and evaluation—in short, their involvement in decision-making regarding their studies. Also, teachers support autonomy raise their students autonomy more internal motivation, curiosity and desire to challenge (Ryan & Deci, 2000).

In the light of this, the two types of motivation, internal and external, support an environment that includes the students, expresses their desires and choices, and does not impose a predetermined "modus operandi", set of contents and/or teaching method on them. Thus, when there is collaboration between teacher and students, with the teacher demonstrating leadership in the classroom and giving the students responsibility and freedom of action, and the design of the learning environment grants the students autonomy in their choice of assignments, their motivation and cognitive involvement are likely to increase (Hanrahan, 1998) and their achievements may well improve (Henderson et al., 2000). Moreover, as behaviors are based on external motivation are inherently interesting, the main reason people are expected to agree to perform these behaviors is due to the appreciation from the people that are important for them and they feel a connection to them. In the theory of self-direction above description called belonging. This means that school pupils willingness to accept the proposed values depend on their sentiment whether the teacher respect and care about them (Ryan & Deci, 2000).

The findings from the profile analysis show that at the beginning of the course, most of the students reported that they were trying not to be late or to miss lessons, and were making every effort to do well. However, the students complained about the fact that the course was being held during the summer vacation. In addition, the intensity of the course bothered them and encroached on the amount of time available to them. The findings from the profile analysis at the end of the course show that most of the students reported that they did their homework and assignments with a feeling of enjoyment and fun, learned a great deal from the discussions and from their peers' questions and answers during the lesson, and liked the variety of teaching methods employed by the lecturers as well as the latter's expertise.

**Discussion of the Analysis of the Reflection Reports**

As in the motivation questionnaires, the analysis of the reflection reports formulated by the students at the beginning and end of the course revealed a noticeable rise in the level of motivation. This rise can be explained by means of three factors that are associated with the contents and characteristics of the course, "Education for Thinking".

(a) The variety of teaching methods employed in the course, "Education for Thinking": The students were exposed to diverse teaching methods. In contrast to many other courses in which frontal teaching was the norm, the students in the above-mentioned course participated in discussions, worked in groups, and used the library to explore questions and problems concerning a broad range of issues in the course. They took part in tasks that were diverse from the point of view of the activities they were required to perform in each and every task, and in most cases were active, assumed a central role in the learning activity, and were responsible for comprehending the material and for their progress in the learning stages. The feeling that accompanied the students, as can be learned from their reflection reports, was one of enjoyment and desire to continue activities like those both in the future and in the rest of their courses; they described this as "whetting their appetites". Among the ways of teaching they particularly lauded were the group and plenary discussions and the group work on the various tasks.

The findings of the present study corresponded with those of Mistler-Jackson and Songer (2000), who found variety in ways of teaching/learning, such as the use of the Internet and group work, to be instrumental in increasing interest, enjoyment and motivation among science students.

(b) Full collaboration of the students in determining the course contents: The students in the course, "Education for Thinking", were partners in the decision-making regarding the course components. Course contents, evaluation methods, assignments and even the syllabus were determined in conjunction with the students. The lecturers directed the students autonomously to the databanks in order to develop their feelings of autonomy. The aim was not only to seek learning materials but also to decide upon their inclusion in the syllabus after the discussion with the rest of the group. In addition to the enjoyment and the desire to devote more time to the assignments, the students reported expanded horizons and a feeling of autonomy and full collaboration in deciding upon contents, assignments and evaluation methods. The students' reports correspond with the findings of Khalil and Saar (2009), who found that collaboration between teachers and students is likely to foster a positive, constructive and motivational learning environment.

Even in cases where the collaboration between teachers and students was not full, the research showed that a learning environment that grants the students autonomy in the choice of activities they wish to perform is likely to increase their motivation and cognitive involvement (Hanrahan, 1998). Henderson et al. (2000) also found that when the teacher demonstrates leadership in the classroom and accords the pupils responsibility and freedom of action, their academic achievements improve. Autonomy in the choice of learning environment is likely to improve the students' academic achievements (Fraser, 1998; Ryan & Deci, 2000; Fraser & Aldridge, 2002). This refers to an environment that includes them, takes their wishes, interests and choices into account, and does not impose a sole "modus operandi" on them from above.

(c) The use of alternative evaluation methods: Portfolios and reflection reports. The course participants, together with the lecturers, built portfolios that contained the assignments, the course products, and written reflection sheets to accompany those products. Evaluation by means of the portfolio permitted the students to be involved in and responsible for their learning, including their participation in setting criteria for evaluating their work and providing opportunities for self- and peer evaluation. In addition, the students' prerogative to rewrite their papers or to submit the portfolios for the teacher's evaluation more than once decreased the threat felt by the students vis-à-vis the traditional evaluation methods, since they understood that they could improve their work at any time—and consequently, also their achievements.

Nisan (1980) pointed out that evaluation in school has a broad motivational effect. Rozner (1998) evaluated the change in the matriculation examination format in the framework of Project 22 (an experimental project initiated by the Ministry of Education as a result of the recommendations of the Ben-Peretz Committee). Twenty-two schools throughout the country participated in the project for three years, starting from 1994/1995. Those schools were granted special permission to evaluate their students in several subjects, using ongoing school evaluation—alternative evaluation—equivalent to the matriculation exams. Rozner examined the effect of the alternative evaluation methods (mainly the portfolio) on teaching/learning processes. He found that the use of alternative evaluation by means of portfolios resulted in a significant improvement in the students' motivation, in the learning climate and in the students' involvement and responsibility, similar to the findings that emerged in the present study. Thus, evaluating the examinees' performance by means of portfolios that can be improved after checking, those increase the examinees' motivation and improves their achievements.

Both Rozner's (1998) and our findings regarding the increase in students' motivation and responsibility for learning as a result of evaluation by means of portfolios correspond with the objectives of alternative evaluation, according to Birnbaum (1997), and are supported by Shulman (1992), who, in his article "Democracy and Pedagogy", described a school in the U.S. in which evaluation is based on portfolios. Shulman

reported that an atmosphere of a learning community, enthusiasm and self-realization prevailed in the school. According to him, the quality and standard of the portfolios were high.

Mitchell (1992) also mentioned the rise in students' motivation as one advantage of portfolios, and enumerated several more: the ability of the portfolio to serve simultaneously as a study tool and as a medium for evaluation; its ability to demonstrate progress in accomplishing preset goals; its ability to involve the parents, thereby increasing the student's motivation. Moreover, the method contributes to an improvement in the teachers' professionalism and encourages creativity. Evaluation by means of portfolios is attractive to those involved in learning processes and does not constitute a threat to either the students or their teachers, as Silberstein (1998) explained: "Reflective learning accepts the constructivist standpoint as explaining the nature of the learning process and assumes a type of learner with self-direction, who demonstrates a capacity for selecting learning goals, ways of learning, self-criticism, evaluation and internal motivation". Rand (1992) differentiated between internal motivation, which stems from the learner's interest and from what he is learning, and external motivation, which is nourished by external rewards. He claimed that traditional examinations exert an influence primarily on external motivation; in contrast, alternative evaluation increases internal motivation (Kaplan & Asor, 2001; Mitchell, 1992; Rozner, 1998; Shulman, 1992).

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# Global Competency Assessment Scale for Undergraduates in the Contemporary China's Higher Education

Jian Li, Jinhui Xu

Indiana University Bloomington, Bloomington, U.S.A

The purpose of this study is to design global competitive competency assessment scale for undergraduates in China. Cultivating global competency is essential to enhance cross-cultural competitiveness and comprehensive competitive power. Specifically, the global competency is an assessment tool that measures the level of intercultural competency/sensitivity for the individual level for perceiving global cultural capacity in global culture context. By applying item response theory to examine different items contributing cultivating global competency, criterion validity of this assessment was assessed. The results indicate that the global competency assessment scale has strong predictive validity toward the bottom-line goals at an individual level.

*Keywords:* Global Competency Assessment Scale, contemporary China's higher education, undergraduates, global competency

## Introduction

In order to develop into vibrant, mutually beneficial partnerships among nations, gaining an in-depth understanding of cross culture is essential in contemporary world (Merryfield, 2001). Moreover, building effective and positive relationships among different cultures, breaking down the barriers of prejudice, and racism, offering international collaborations are both significant to individual and institutional global competitiveness. Expanding the intercultural competent involves in constructing the intercultural-awareness (Hammer, 2012). The American Association of Colleges and Universities (2007) argued that there are a number of core learning outcomes that is necessary to assist students to face with the challenges of a global society. The development of individual and social responsibility is importance, particularly as it connected to the intercultural knowledge, competence, and engagement. Moreover, Chickering and Braskamp (2009) also highlighted that the conceptual ideas of developing and internalizing a global perspective into individual thinking and identity (p. 27). In order to prepare students more adequately for the challenges of an increasingly diverse and global society, the educators and administrators recognized the importance of global insight or perspective (Braskamp, 2011; Engberg & Hurtado, in press; Hurtado, 2003). In accordance with enhance cross-cultural competitiveness and comprehensive competitive power, it is essential to cultivate global competency. Specifically, this study aims at designing global competitive competency assessment scale for undergraduates in China. This research also focused on generating an assessment tool that measures the level of intercultural competency/sensitivity for the individual level for perceiving global cultural capacity in global culture context.

Jian Li, Ph.D. Student, School of Education, Indiana University Bloomington.
Jinhui Xu, Master Student, Department of Statistics, Indiana University Bloomington.

## Literature Review

Generally speaking, global competence can improve organizational and individual effectiveness in learning and career success. The importance of international communication knowledge and skills is considered to guarantee career success in global context. In the globally integrated labor market, striving to obtain global competence can ensure the organizational and individual competiveness and effectiveness. It seemed plausible to encourage students to utilize global competence to cope with different issues in response to different foreign tasks.

The interconnection among politics, culture, environment and technologies witnesses dramatic increases during recent decades (Merryfield, 2008). The interconnection is associated with the international trades, migration flow, and effective communications. Complex global issues also influence the development of regional economic conflicts. So, mastering a multidisciplinary and global knowledge can be considered as one crucial factor to competitive with others (Lohmann & Rollins, 2006). However, according to recent studies of American Council on Education (ACE), they found that few higher education institutions emphasized on improving internationalization and globalization levels. In addition, National Research Council also indicated that improving student global competency is important to cultivate global corporate skills (Reimers, 2009). The cross-cultural and globally oriented education consistently encourages higher education institutions to cultivate global citizens with intercultural sensitivity and global competency. Cross-cultural study can always be regarded as one main approach to deepen students' global perspectives and competences (Hill, 1991). Alternative pedagogical management should cultivate student global competence in the long term. In higher education system, the student global competence is always considered as significant learning outcome. However, there is still much more controversial to define the ideas of global competence and perspective. Additionally, how to design and implement pedagogical interventions to promote student global competency are still confused by policymakers in current global education background (Fantini, 2009).

There existed little effort to standardize the evaluation or assessment of global education in US. Godbey (2002) indicated that universities graduates were lack of global knowledge and skills to enable them to be global graduates. Deardorff (2004) also argued that few American institutions enable cultivate global undergraduates. Green (2000) also made similar conclusion that few American college graduates are fully competent to perform in different kinds of cultures, speak foreign language, or holding some significant understanding of the world worldwide. Gliozzo (2002) also noted that Americans were lack of the most global knowledge and skills, which are necessary to act in multicultural environments. In order to qualify the global competent citizens, the ACE suggested that America's future should concentrate on developing a global citizen by training advance foreign language and intercultural knowledge. ACE (2000) further indicated that mastery of intercultural competency and global knowledge is an important component of an effective international education. Curran (2003) suggested that the global competent is the capacity to be familiar with the global environment. Moreover, Wilson and Dalton (1997) concluded that the perceptual knowledge (open-mindedness, resistance to stereotyping, complexity of thinking, and perspective consciousness) and substantive knowledge (of cultures, languages, world issues, global dynamics, and human choices) were integral parts of delimiting global competence. The higher education should has indispensible responsibility to educate students to be knowledgeable and responsible as they are engaged in the international context to learn foreign languages, to be knowledgeable of the across-culture, the economics and policies of the countries they will visit, to interact in a intercultural way (Rimer, 2004). In accordance with seeking to expand the intercultural horizons and improving

intercultural opportunities, most of countries, such as UK, France, Italy, and Australia, implemented effective relevant policy to stimulate the development of global education.

The intercultural/across cultural is more and more becoming a institutional recognition to design global curricular program and projects in terms of improving the global competency institutionally. There exists less research that defining the concept of global competency in response to the rapid increasing number of international student mobility across China. Within the limitation of this research, there is no relevant consensus for undergraduates in China. In order to provide effective suggestion in improving global competency for China's institutions, this research has been undertaken to development the new definitions of competitive global competency for the contemporary China's higher education system. The ultimate purpose of this research is to encourage institutional administers to design and create a global competitive curriculum and provide effective and sufficient actives to guarantee individual competent globally.

## Methodology

**Descriptive Data Analysis**

This survey aims at the study of Chinese undergraduate students from five grades, thirteen majors in eight universities from Beijing, China. The total sample size is 2,505. All the respondents answered this questionnaire by paper-based survey. In this study, we applied SPSS 23.0, Stata 14.1 and Conquest 4.0 to analyze the variables. Specifically, Global Competency Assessment Questionnaire with Rating Scale has been entitled in this survey. In order to guarantee the reliability and validity of this rating scale questionnaire, we designed the questionnaire concerning on the definition of the dimensions we adopt. We used 5-point Likert scale to score the answers of each question. The respondents answered all the questions in the questionnaire relating to personal psychical cognition. In this study, the rating scale questionnaire includes five sections, which included personal social background, global knowledge, global skill, global attitude and global experience. Moreover, comparing with the traditional survey and questionnaire concerning on student's global competency, we add global experience as our new dimension in consistent with our theoretical framework (see Figure 1).
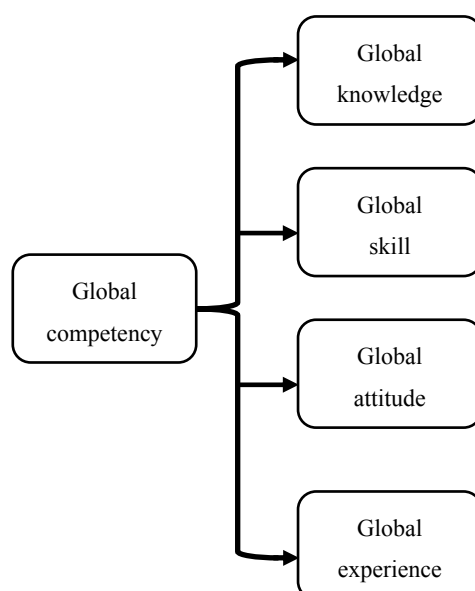


*Figure 1.* Global competency assessment scale.

This survey contains 13 questions concerning on personal social and educational background information, which includes gender, university, discipline (major), year of the grade, university classification, family location, whether respondent had intercultural training or internship, whether has global experience, parents' education background, family monthly income, demographic and academic performance (see Table 1).

Table 1

*Descriptive Data of the Study*

| Variable | *N* | Percentage (%) |
|---|---|---|
| **Sex** | 2,505 | |
| Male | 1,260 | 50.30 |
| Female | 1,245 | 49.70 |
| **University** | 2,505 | |
| Beihang University | 852 | 34.01 |
| Capital Normal University | 297 | 11.86 |
| Beijing Normal University | 292 | 11.66 |
| Beijing City University | 278 | 11.10 |
| China Agricultural University | 272 | 10.86 |
| Beijing University of Technology | 242 | 9.66 |
| China University of Geosciences | 218 | 8.70 |
| China Institute of Industrial Relations | 52 | 2.16 |
| **Discipline** | 2,505 | |
| Engineering | 1,323 | 52.81 |
| Science | 277 | 11.06 |
| Education | 273 | 10.90 |
| Economics | 182 | 7.27 |
| Management | 165 | 6.59 |
| Law | 62 | 2.48 |
| Literature | 57 | 2.28 |
| Agriculture | 31 | 1.24 |
| Philosophy | 15 | 0.60 |
| History | 6 | 0.24 |
| Arts | 5 | 0.20 |
| Medicine | 3 | 0.12 |
| Else | 105 | 4.19 |
| **Grade** | 2,503 | |
| Freshmen | 545 | 21.77 |
| Sophomore | 846 | 33.80 |
| Junior | 701 | 28.01 |
| Senior | 409 | 16.34 |
| Fifth-year Student | 2 | 0.08 |
| **University classification** | 2,505 | |
| 985-Project University | 1,416 | 56.53 |
| 211-Project University | 491 | 19.60 |
| Others | 598 | 23.97 |
| **Family location** | 2,498 | |
| Urban | 1,774 | 71.02 |
| Rural | 724 | 28.98 |
| **Intercultural training or internship** | 2,498 | |
| Have no experience for intercultural training or internship | 2,045 | 81.87 |
| Have experience for intercultural training or internship | 453 | 18.13 |
| **Global experience** | 2,495 | |
| Have no experience for intercultural training or internship | 2,169 | 86.93 |
| Have experience for intercultural training or internship | 326 | 13.07 |
| **Father's education background** | 2,489 | |
| Not be educated | 21 | 0.84 |
| Elementary School | 156 | 6.27 |
| Middle School | 512 | 20.57 |
| High School or Secondary Specialized School | 803 | 32.26 |

Table 1 continued

| Variable | N | Percentage (%) |
|---|---|---|
| University/College | 877 | 35.24 |
| Master | 84 | 3.37 |
| Ph.D | 36 | 1.45 |
| **Mother's education background** | 2,488 | |
| Not be educated | 54 | 2.17 |
| Elementary School | 259 | 10.41 |
| Middle School | 536 | 21.54 |
| High School or Secondary Specialized School | 776 | 31.19 |
| University / College | 779 | 31.31 |
| Master | 60 | 2.41 |
| Ph.D | 24 | 0.96 |
| **Family monthly total income (RMB, unit: Yuan)** | 2,398 | |
| Below 1,000 | 146 | 6.09 |
| 1,000-2,999 | 388 | 16.18 |
| 3,000-5,999 | 799 | 33.32 |
| 6,000-9,999 | 617 | 25.73 |
| 10,000-14,999 | 239 | 9.97 |
| 15,000-19,999 | 95 | 3.96 |
| 20,000-29,999 | 49 | 2.04 |
| Above 30,000 | 65 | 2.71 |
| **Demographic** | 2,273 | |
| Beijing | 555 | 24.42 |
| Shandong | 138 | 6.07 |
| Henan | 113 | 4.97 |
| Hebei | 109 | 4.80 |
| Hubei | 84 | 3.70 |
| Shanxi | 80 | 3.52 |
| Inner Mongolia | 78 | 3.43 |
| Shaanxi | 77 | 3.39 |
| Sichuan | 75 | 3.30 |
| Anhui | 74 | 3.26 |
| Hunan | 74 | 3.26 |
| Heilongjiang | 65 | 2.86 |
| Zhejiang | 65 | 2.86 |
| Jiangxi | 62 | 2.73 |
| Guizhou | 60 | 2.64 |
| Gansu | 59 | 2.60 |
| Xinjiang | 56 | 2.46 |
| Liaoning | 55 | 2.42 |
| Jilin | 53 | 2.33 |
| Chongqing | 48 | 2.11 |
| Fujian | 46 | 2.02 |
| Tianjin | 45 | 1.98 |
| Jiangsu | 44 | 1.94 |
| Yunnan | 34 | 1.50 |
| Guangxi | 30 | 1.32 |
| Guangdong | 24 | 1.06 |
| Ningxia | 23 | 1.01 |
| Qinghai | 15 | 0.66 |
| Shanghai | 14 | 0.62 |
| Hainan | 12 | 0.53 |
| Tibet | 5 | 0.22 |
| Hong Kong | 1 | 0.04 |
| **Academic performance last year** | 2,491 | |
| Previous 25% | 713 | 28.62 |
| 25%-50% | 658 | 26.42 |
| 50%-75% | 448 | 17.98 |
| Post 75% | 212 | 8.51 |
| Unknown | 460 | 18.47 |

## Dimensions of Global Competency Assessment Questionnaire with Rating Scale

There are totally 45 questions in this macro section with 4 dimensions—global knowledge, global skill, global attitude and global experience. In another words, all these four dimensions contribute to assess and evaluate the global competency.

**Global Knowledge**

There are totally 11 questions: item 14 to 24. We use 5-point Likert scale for scoring: (1) The score of strongly disagree is one; (2) The score of disagree is two; (3) The score of unsure is three; (4) The score of agree is four; (5) The score of strongly agree is five.

**Global Skill**

In this section, we try to know the actual intercultural skills of respondent. There are totally 9 questions: item 25 to 30, 35 to 36 and 49. We use 5-point Likert scale for scoring. For item 25 to 30, 35 to 36, (1) The score of strongly disagree is one; (2) The score of disagree is two; (3) The score of average is three; (4) The score of agree is four; and (5) The score of strongly agree is five. For item 49, (1) The score of very low is one; (2) The score of quite low is two; (3) The score of unsure is three; (4) The score of quite high is four; and (5) The score of very high is five;

**Global Attitude**

We try to know the respondent's attitude towards inter-culture. There are totally 15 questions: item 31 to 33 and 37 to 48 (including a counter question, item 48). We use 5-point Likert scale for scoring: (1) The score of strongly disagree is one; (2) The score of disagree is two; (3) The score of unsure is three; (4) The score of agree is four; and (5) The score of strongly agree is five.

**Global Experience**

In this part, we try to know the actual intercultural experiences or trainings of respondent. There are totally 10 questions: item 34 and 50 to 58. We used 5-point Likert scale for scoring. For item 34, (1) The score of strongly disagree is one; (2) The score of disagree is two; (3) The score of unsure is three; (4) The score of agree is four; and (5) The score of strongly agree is five. For item 50 to 56 and 58, (1) The score of zero time is one; (2) The score of once is two; (3) The score of twice is three; (4) The score of three times is four; and (5) The score of four times or more is five. For item 57, (1) The score of none is one; (2) The score of two months or longer is two; (3) The score of once a month is three; (4) The score of twice a month is four; and (5) The score of once a week is five (see Table 2).

Table 2

*The Question Summary of the Scales*

| Dimension | Amount of questions |
|---|---|
| Knowledge | 11 |
| Skill | 9 |
| Attitude | 15 |
| Experience | 10 |
| Total | 45 |

**Reliability and Validity Analysis**

The reliability and validity of this survey have been reported as follows: the coefficient of the internal reliability for respondents, the whole survey's Cronbach alpha equals to 0.915, the Cronbach alpha for global

knowledge, skill, attitude and experience equal to 0.886, 0.848, 0.869, and 0.754, respectively, which demonstrated the survey data for the respondents has great internal reliability. In addition, analyzing the validity of the data. We obtain that the value of Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy equals to 0.937, and the *p*-value for Bartlett's test of sphericity is equal to 0, which indicates that the data is of a great validity and suitable within the data, and it is suitable to make the further analysis with both questionnaire and respondents' global competency.

## Data Analysis

### Item Response Theory

Item response theory (IRT) is considered as a paradigm for designing, analyzing, and scoring of tests, questionnaires, and similar instruments measuring abilities, attitudes, or other variables, which emerged as early as the 1940s though the popularity came much later in the 1970s. It is based on the concept of the probability of a correct/keyed response to an item, which is a mathematical function of person and item parameters. The person parameter is construed as (usually) a single latent trait or dimension. Broadly speaking, IRT models can be divided into two bodies: uni-dimensional and multidimensional.

Specifically, Uni-dimensional IRT Models for Dichotomous Responses hold two fundamental assumptions: uni-dimensionality and local independence. The assumption of uni-dimensionality is related to a set of items and/or a test measure(s) only one latent trait ($\theta$), and local independence refers to the assumption that there is no statistical relationship between examinees' responses to the pairs of items in a test, once the primary trait measured by the test is removed. The two assumptions are really just different approaches and the third main assumption focused on modeling the relationship between the trait measured by the test and item responses. Historically, there are some classical models: the normal ogive model was regarded as the first IRT model focusing on measuring psychological and/or educational latent traits (Richardson, 1936; Mosier, 1940, 1941; Ferguson, 1942; Lawley, 1943). In the model, an item characteristic curve (ICC) is derived from the cumulative density function (CDF) of a normal distribution; One-Parameter Logistic Model (1PLM/Rasch Model) is related to a mathematician in Denmark, George Rasch, followed up with a various approach to IRT in the 1950s (Rasch, 1960(1980); 1961; 1967; 1968). He used a logistic function to derive an ICC instead of the normal ogive function and his model contributed to simplifying the normal ogive model and the complexity of computation; Two-Parameter Logistic Model (2PLM) is a generalization of the 1PLM. Instead of having a fixed discrimination of "1" across all items as in 1PLM, in the 2PLM, each item has its own discrimination parameter; Three-Parameter Logistic Model (3PLM) provides an ICC to have non-zero lower asymptotes and this model is more suitable for response data with those items in which examinees at the extremely low proficiency level may get the items correctly by chance; Nonparametric Item Response Model (ICCs) are characterized by a single function in IRT models with parameters. Additionally, Ramsay (1991) proposed a kernel smoothing approach for nonparametric item response models. Nonparametric item response models may not be as practically useful for operational uses as parametric models because nonparametric item response models do not provide informative, interpretable item parameters, and it is hard to equate tests under nonparametric models. However, nonparametric models are frequently used for research purposes such as evaluating model fit for parametric models since nonparametric models produce item characteristic functions that are very close to the observed data. Moreover, there also existed some specific models generated by many scholars consistently: Partial Credit Model (PCM) is an extension of the 1PLM (a.k.a., Rasch model) (Masters,

1982; 1986; 1988a; 1988b); Generalized Partial Credit Model (GPCM) (Muraki, 1992) is a generalization of the PCM with a parameter for item discrimination added to the model; Graded Response Model (GRM) was introduced by Samejima (1968; 1972; 1995) to handle ordered polytomous categories such as letter grading, A, B, C, D, and F and polytomous responses to attitudinal statements (such as a Likert scale); Nominal Response Model (NRM) was also introduced by Bock (1972). Therefore, the values of the responses do not represent some sort of scores on items, but just nominal indications for response categories. Some applications of the NRM are found in uses with multiple choice items. Additionally, Multidimensional Compensatory Three-Parameter Logistic Model (MC3PLM) can be seen as an extension of the uni-dimensional 3PL model. Moreover, IRT is suitable for Likert-scale tradition (Andrich, 1978).

**Rating Scale Model (RSM)**

Rating Scale Model (RSM) is one of the models of Rasch family, always applied in the rating scale survey. There are two different approaches to the rating scale model. Andersen's (1977; 1983) proposed a response function, in which the values of the category scores are directly used as a part of the function:

$$P_{ix}(\theta) = \frac{e^{w_i\theta - a_{ix}}}{\sum_{x=1}^{m} e^{w_x\theta - a_{ix}}}$$

where $w_1, w_2, \ldots, w_m$ are the category scores, which prescribe how the $m$ response categories are scored, and $a_{ih}$ are item parameters connected with the items and categories. An important assumption of this model is that the category scores are equidistant. Linear Rating Scale Model (LRSM) was proposed to generalized Racsh model and rating scale model (Fischer & Parzer, 1991). Since the whole scale is used 5-point Likert scale, which is also ordered, we adopt the RSM we introduced as our analyzing method.

**Fundamental Estimation: The Analysis and Estimation of Item Difficulty**

In application, we usually set the difficulty of the item from the range of -3 to 3. The larger the value, represents the more difficult in this item; the smaller the value, represents the easier of the item (Yu, 2009).

**Test of Goodness-of-Fit**

We used the indexes *T*-value and MNSQ (Fit mean-square) to judge the goodness of the items. For *T*-value, with 95% significant level, the range of the value is from -1.96 to 1.96. Out of this range means the answers of the item has the significant difference between what we expect and reality. MNSQ is the standardized mean-square residual summary statistics, describing the variance between observation values and expected values for all respondents' answers of the item. For rating scale model, the range of the MNSQ value is from 0.6 to 1.4, which means the respondent's response conforms to the what we expect of the item. Informal simulations studies and experience analyzing hundreds of datasets indicate that when MNSQ is larger than 2, it distorts or degrades the measurement system; when MNSQ is from 1.4 to 2, it is unproductive for construction of measurement, but not degrading; when MNSQ is smaller than 0.6, it is less productive for measurement, but not degrading, which may produce misleadingly good reliabilities and separations. Totally, when MNSQ is larger than 1.4, in indicates that the item measures the other specialties rather than the dimension now; when MNSQ is smaller than 0.6, it indicates that the item may be covered by the other items. Specifically, when MNSQ equals to 1, it means the response completely conforms to expectation (Wright, Linacre, Gustafson, & Martin-Lof, 1994).

**The Analysis and Estimation of Category Difficulty (Strata)**

The value of the estimation of category difficulty ranges from low to high, the higher value of the estimation means the more difficult that the respondent reaches the standard (Yu, 2009). Since in our study, we

use 5-point Likert scale, we rationally set four categories in this case. The larger the estimation coefficient, the harder that the respondent reaches this category; the smaller the estimation coefficient, the easier the respondent reached this category. The category also represents the ability level of the total ability.

**Scale Reliability Analysis**

In our study, we adopt EAP/PV reliability index to test the reliability of our rating scale. EAP/PV reliability is explained variance according to the estimated model divided by total person variance (Adams, 2006) (Wu, Adams, & Wilson, 2007). The EAP/PV reliability estimates reported comes from an analysis of all student responses from across the forms, which includes all of the item data missing due to the test design, and thus gives an underestimate of the reliability for those constructs that one would expect in a normal administration (Schwartz, 2012). Also, EAP/PV reliability can be interpreted like Cronbach's alpha (Draney & Wilson, 2008). However, It is based on the item response model estimates rather than the raw score, and it is useful in situations where there is too much planned missing data for Cronbach's alpha to be estimated (Scalise, Madhyastha, Minstrell, & Wilson, 2010).

**RSM Analysis**

Firstly, we used Conquest 4.0 to analyze out scale data. The total output and the outputs for each dimension have been shown from Table 3 to Table 7, the item separation reliability (ISR) is 0.998. ISR gives the test user an indication of how well items are separated by the persons taking the test. It equals to

$$ISR = 1 - [\frac{MSE_i}{SD_i^2}]$$

where $MSE_I$ is the mean square error of the item and $SD_I$ is the standard deviation of the item. In this case, it means all the items in the survey are sufficiently well separated in difficulty to identify the direction and meaning of the variable.

Table 3

*The Estimated Coefficients for Items and Total Numbers of Respondents for Each Option in the Questionnaire*

| Item | Estimate | Error | MNSQ | *T* | Respondent | Respondent for each option | | | | |
|------|----------|-------|------|-----|------------|---|---|---|---|---|
| | | | | | | 1 | 2 | 3 | 4 | 5 |
| 14 | 0.351 | 0.017 | 0.90 | (-3.5) | 2,500 | 180 | 650 | 780 | 743 | 147 |
| 15 | 0.246 | 0.017 | 0.74 | (-10.1) | 2,503 | 118 | 592 | 867 | 809 | 117 |
| 16 | -0.080 | 0.017 | 0.74 | (-10.1) | 2,500 | 103 | 472 | 656 | 1,078 | 191 |
| 17 | -0.181 | 0.017 | 0.84 | (-6.1) | 2,502 | 79 | 407 | 699 | 1,115 | 202 |
| 18 | 0.457 | 0.017 | 0.77 | (-8.9) | 2,502 | 136 | 703 | 945 | 627 | 91 |
| 19 | 0.069 | 0.017 | 0.75 | (-9.7) | 2,502 | 97 | 510 | 815 | 930 | 150 |
| 20 | 0.004 | 0.017 | 0.84 | (-5.8) | 2,501 | 107 | 471 | 757 | 1,005 | 161 |
| 21 | -0.269 | 0.018 | 0.78 | (-8.2) | 2,503 | 90 | 297 | 753 | 1,149 | 214 |
| 22 | -0.250 | 0.018 | 0.74 | (-10.1) | 2,501 | 66 | 308 | 813 | 1,119 | 195 |
| 23 | -0.075 | 0.017 | 0.78 | (-8.3) | 2,499 | 75 | 376 | 903 | 987 | 158 |
| 24 | -0.269* | 0.055 | 1.07 | (2.4) | 2,502 | 83 | 382 | 663 | 1,100 | 274 |
| 25 | -0.365 | 0.017 | 0.87 | (-5.0) | 2,501 | 151 | 532 | 862 | 790 | 166 |
| 26 | -0.122 | 0.016 | 1.13 | (4.3) | 2,500 | 240 | 682 | 739 | 673 | 166 |
| 27 | -0.045 | 0.016 | 0.78 | (-8.4) | 2,502 | 202 | 746 | 834 | 590 | 130 |
| 28 | 0.155 | 0.016 | 0.72 | (-11.1) | 2,501 | 234 | 840 | 875 | 471 | 81 |
| 29 | 0.314 | 0.016 | 0.74 | (-10.0) | 2,503 | 310 | 908 | 823 | 369 | 93 |
| 30 | -0.007 | 0.016 | 0.88 | (-4.6) | 2,499 | 218 | 729 | 862 | 586 | 104 |

Table 3 continued

| Item | Estimate | Error | MNSQ | *T* | Respondent | Respondent for each option | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | 2 | 3 | 4 | 5 |
| 31 | 0.729 | 0.017 | 0.99 | -0.3 | 2,496 | 144 | 574 | 728 | 921 | 129 |
| 32 | 0.324 | 0.017 | 0.90 | (-3.5) | 2,497 | 95 | 371 | 663 | 1,181 | 187 |
| 33 | 1.047 | 0.016 | 1.03 | 1.1 | 2,501 | 186 | 666 | 1,016 | 535 | 98 |
| 34 | -0.774 | 0.019 | 1.58 | (17.4) | 2,499 | 589 | 978 | 471 | 383 | 78 |
| 35 | -0.001 | 0.016 | 0.77 | (-8.8) | 2,501 | 227 | 637 | 1,009 | 548 | 80 |
| 36 | -0.019 | 0.016 | 0.80 | (-7.6) | 2,502 | 205 | 617 | 1,088 | 507 | 85 |
| 37 | 0.126 | 0.017 | 0.86 | (-5.2) | 2,504 | 82 | 298 | 667 | 1,177 | 280 |
| 38 | -0.260 | 0.017 | 0.82 | (-6.9) | 2,501 | 72 | 201 | 460 | 1,345 | 423 |
| 39 | -0.130 | 0.017 | 0.86 | (-5.1) | 2,503 | 85 | 222 | 567 | 1,200 | 429 |
| 40 | -0.057 | 0.017 | 0.89 | (-4.2) | 2,503 | 86 | 242 | 605 | 1,154 | 416 |
| 41 | -0.237 | 0.018 | 0.69 | (-12.4) | 2,501 | 66 | 173 | 508 | 1,346 | 408 |
| 42 | -0.312 | 0.018 | 0.70 | (-11.9) | 2,504 | 52 | 154 | 456 | 1,433 | 409 |
| 43 | -0.433 | 0.018 | 0.72 | (-11.2) | 2,504 | 51 | 126 | 392 | 1,455 | 480 |
| 44 | -0.404 | 0.018 | 0.79 | (-8.2) | 2,502 | 49 | 136 | 402 | 1,427 | 488 |
| 45 | -0.682 | 0.018 | 1.10 | (3.3) | 2,503 | 41 | 107 | 354 | 1,274 | 727 |
| 46 | -0.463 | 0.018 | 1.05 | 1.9 | 2,503 | 44 | 112 | 470 | 1,301 | 576 |
| 47 | -0.386 | 0.018 | 1.00 | 0.0 | 2,501 | 51 | 114 | 485 | 1,355 | 496 |
| 48 | 1.138[*] | 0.065 | 3.30 | (51.9) | 2,503 | 664 | 482 | 341 | 613 | 403 |
| 49 | 0.089[*] | 0.047 | 0.79 | (-8.2) | 2,494 | 219 | 491 | 1,447 | 295 | 42 |
| 50 | -0.552 | 0.019 | 1.41 | (13.0) | 2,494 | 770 | 849 | 580 | 168 | 127 |
| 51 | 0.201 | 0.021 | 1.40 | (12.5) | 2,494 | 1,336 | 580 | 417 | 98 | 63 |
| 52 | 0.179 | 0.021 | 1.76 | (21.9) | 2,494 | 1,324 | 660 | 314 | 86 | 110 |
| 53 | 0.369 | 0.021 | 1.36 | (11.5) | 2,493 | 1,422 | 627 | 284 | 79 | 81 |
| 54 | -0.249 | 0.020 | 1.63 | (18.7) | 2,492 | 1,126 | 733 | 289 | 125 | 219 |
| 55 | 0.108 | 0.021 | 1.42 | (13.0) | 2,429 | 1,306 | 546 | 352 | 121 | 104 |
| 56 | 1.379 | 0.024 | 1.37 | (11.5) | 2,429 | 1,919 | 291 | 152 | 45 | 22 |
| 57 | -1.078 | 0.019 | 3.27 | (50.7) | 2,430 | 1,278 | 136 | 135 | 148 | 733 |
| 58 | 0.417* | 0.062 | 1.40 | (12.5) | 2,430 | 1,393 | 688 | 180 | 61 | 108 |

*Notes.* [*] It is constrained; "__" It marks the value of MNSQ exceeds the range of (0.6, 1.4); "( )" It marks the *T*-value that exceeds. the range of (-1.96, 1.96).

Table 4

*The Estimated Coefficients for Knowledge and Total Numbers of Respondents for Each Option*

| Item | Estimate | Error | MNSQ | *T* | Respondent | Respondent for each option | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | 2 | 3 | 4 | 5 |
| 14 | 0.351 | 0.017 | 0.90 | (-3.5) | 2,500 | 180 | 650 | 780 | 743 | 147 |
| 15 | 0.246 | 0.017 | 0.74 | (-10.1) | 2,503 | 118 | 592 | 867 | 809 | 117 |
| 16 | -0.080 | 0.017 | 0.74 | (-10.1) | 2,500 | 103 | 472 | 656 | 1,078 | 191 |
| 17 | -0.181 | 0.017 | 0.84 | (-6.1) | 2,502 | 79 | 407 | 699 | 1,115 | 202 |
| 18 | 0.457 | 0.017 | 0.77 | (-8.9) | 2,502 | 136 | 703 | 945 | 627 | 91 |
| 19 | 0.069 | 0.017 | 0.75 | (-9.7) | 2,502 | 97 | 510 | 815 | 930 | 150 |
| 20 | 0.004 | 0.017 | 0.84 | (-5.8) | 2,501 | 107 | 471 | 757 | 1,005 | 161 |
| 21 | -0.269 | 0.018 | 0.78 | (-8.2) | 2,503 | 90 | 297 | 753 | 1,149 | 214 |
| 22 | -0.250 | 0.018 | 0.74 | (-10.1) | 2,501 | 66 | 308 | 813 | 1,119 | 195 |
| 23 | -0.075 | 0.017 | 0.78 | (-8.3) | 2,499 | 75 | 376 | 903 | 987 | 158 |
| 24 | -0.269[*] | 0.055 | 1.07 | (2.4) | 2,502 | 83 | 382 | 663 | 1,100 | 274 |

*Notes.* [*] It is constrained; "( )" It marks the *T*-value that exceeds the range of (-1.96, 1.96).

Table 5

*The Estimated Coefficients for Skill and Total Numbers of Respondents for Each Option*

| Item | Estimate | Error | MNSQ | *T* | Respondent | Respondent for each option | | | | |
|------|----------|-------|------|-----|------------|------|------|-------|------|-----|
| | | | | | | 1 | 2 | 3 | 4 | 5 |
| 25 | -0.365 | 0.017 | 0.87 | (-5.0) | 2,501 | 151 | 532 | 862 | 790 | 166 |
| 26 | -0.122 | 0.016 | 1.13 | (4.3) | 2,500 | 240 | 682 | 739 | 673 | 166 |
| 27 | -0.045 | 0.016 | 0.78 | (-8.4) | 2,502 | 202 | 746 | 834 | 590 | 130 |
| 28 | 0.155 | 0.016 | 0.72 | (-11.1) | 2,501 | 234 | 840 | 875 | 471 | 81 |
| 29 | 0.314 | 0.016 | 0.74 | (-10.0) | 2,503 | 310 | 908 | 823 | 369 | 93 |
| 30 | -0.007 | 0.016 | 0.88 | (-4.6) | 2,499 | 218 | 729 | 862 | 586 | 104 |
| 35 | -0.001 | 0.016 | 0.77 | (-8.8) | 2,501 | 227 | 637 | 1,009 | 548 | 80 |
| 36 | -0.019 | 0.016 | 0.80 | (-7.6) | 2,502 | 205 | 617 | 1,088 | 507 | 85 |
| 49 | 0.089[*] | 0.047 | 0.79 | (-8.2) | 2,494 | 219 | 491 | 1,447 | 295 | 42 |

*Notes*. [*] It is constrained; "( )" It marks the *T*-value that exceeds the range of (-1.96, 1.96).

Table 6

*The Estimated Coefficients for Attitude and Total Numbers of Respondents for Each Option.*

| Item | Estimate | Error | MNSQ | *T* | Respondent | Respondent for each option | | | | |
|------|----------|-------|------|-----|------------|------|------|-------|------|-----|
| | | | | | | 1 | 2 | 3 | 4 | 5 |
| 31 | 0.729 | 0.017 | 0.99 | -0.3 | 2,496 | 144 | 574 | 728 | 921 | 129 |
| 32 | 0.324 | 0.017 | 0.90 | (-3.5) | 2,497 | 95 | 371 | 663 | 1,181 | 187 |
| 33 | 1.047 | 0.016 | 1.03 | 1.1 | 2,501 | 186 | 666 | 1016 | 535 | 98 |
| 37 | 0.126 | 0.017 | 0.86 | (-5.2) | 2,504 | 82 | 298 | 667 | 1,177 | 280 |
| 38 | -0.260 | 0.017 | 0.82 | (-6.9) | 2,501 | 72 | 201 | 460 | 1,345 | 423 |
| 39 | -0.130 | 0.017 | 0.86 | (-5.1) | 2,503 | 85 | 222 | 567 | 1,200 | 429 |
| 40 | -0.057 | 0.017 | 0.89 | (-4.2) | 2,503 | 86 | 242 | 605 | 1,154 | 416 |
| 41 | -0.237 | 0.018 | 0.69 | (-12.4) | 2,501 | 66 | 173 | 508 | 1,346 | 408 |
| 42 | -0.312 | 0.018 | 0.70 | (-11.9) | 2,504 | 52 | 154 | 456 | 1,433 | 409 |
| 43 | -0.433 | 0.018 | 0.72 | (-11.2) | 2,504 | 51 | 126 | 392 | 1,455 | 480 |
| 44 | -0.404 | 0.018 | 0.79 | (-8.2) | 2,502 | 49 | 136 | 402 | 1,427 | 488 |
| 45 | -0.682 | 0.018 | 1.10 | (3.3) | 2,503 | 41 | 107 | 354 | 1,274 | 727 |
| 46 | -0.463 | 0.018 | 1.05 | 1.9 | 2,503 | 44 | 112 | 470 | 1,301 | 576 |
| 47 | -0.386 | 0.018 | 1.00 | 0.0 | 2,501 | 51 | 114 | 485 | 1,355 | 496 |
| 48 | 1.138[*] | 0.065 | 3.30 | (51.9) | 2,503 | 664 | 482 | 341 | 613 | 403 |

*Notes*. [*] It is constrained; "__" It marks the value of MNSQ exceeds the range of (0.6, 1.4); "( )" It marks the *T*-value that exceeds the range of (-1.96, 1.96).

Table 7

*The Estimated Coefficients for Experience and Total Numbers of Respondents for Each Option.*

| Item | Estimate | Error | MNSQ | *T* | Respondent | Respondent for each option | | | | |
|------|----------|-------|------|-----|------------|-------|------|------|------|-----|
| | | | | | | 1 | 2 | 3 | 4 | 5 |
| 34 | -0.774 | 0.019 | 1.58 | (17.4) | 2,499 | 589 | 978 | 471 | 383 | 78 |
| 50 | -0.552 | 0.019 | 1.41 | (13.0) | 2,494 | 770 | 849 | 580 | 168 | 127 |
| 51 | 0.201 | 0.021 | 1.40 | (12.5) | 2,494 | 1,336 | 580 | 417 | 98 | 63 |
| 52 | 0.179 | 0.021 | 1.76 | (21.9) | 2,494 | 1,324 | 660 | 314 | 86 | 110 |
| 53 | 0.369 | 0.021 | 1.36 | (11.5) | 2,493 | 1,422 | 627 | 284 | 79 | 81 |
| 54 | -0.249 | 0.020 | 1.63 | (18.7) | 2,492 | 1,126 | 733 | 289 | 125 | 219 |
| 55 | 0.108 | 0.021 | 1.42 | (13.0) | 2,429 | 1,306 | 546 | 352 | 121 | 104 |
| 56 | 1.379 | 0.024 | 1.37 | (11.5) | 2,429 | 1,919 | 291 | 152 | 45 | 22 |
| 57 | -1.078 | 0.019 | 3.27 | (50.7) | 2,430 | 1,278 | 136 | 135 | 148 | 733 |
| 58 | 0.417[*] | 0.062 | 1.40 | (12.5) | 2,430 | 1,393 | 688 | 180 | 61 | 108 |

*Notes*. [*] It is constrained; "__" It marks the value of MNSQ exceeds the range of (0.6, 1.4); "( )" It marks the *T*-value that exceeds the range of (-1.96, 1.96).

Statistically, we observed that (1) for all items, their difficulty is totally in the range of -3 to 3, which means the total difficulty of the survey is quite suitable to respondents; (2) The MNSQ for global knowledge and global skill dimensions are totally within the range of 0.6-1.4, which indicates the response from the respondent conforms to expectation; for attitude dimension, just item 48 has a very large value of MNSQ, which indicates it tends to measure the other specialties of the respondent. Moreover, item 41 is a very good item since it's answer is totally conforming to the expectation with MNSQ equals to 1; for the global experience dimension, the most of the items' MNSQ are larger than 1.4, which indicates that these items tend to measure the other specialties rather than global experience to the respondent; and (3) almost for all the items except some items in the dimension of attitude the $T$-values are not at the range of -1.96 to 1.96, which means that there are significant differences between the actual situation of respondent and expectation.

**Estimation of the Coefficients of Each Category's Difficulty**

Statistically speaking, we observed that it is easiest for respondent to reach category 1, and the category 4 is the hardest level, which indicates that very few people have the comprehensive ability of global competency. Moreover, the MNSQ for each category are all larger than 1.4 indicates the variance of the responses from respondents are very difference from each category; $T$-value all exceed the range of -1.96 to 1.96, which can indicate that there are significant differences between the actual situation and expectation (see Table 8).

Table 8

*The Estimated Coefficients For Category Difficulty*

| Category | Estimate | Error | MNSQ | $T$ |
|---|---|---|---|---|
| 0 | | | 2.79 | (43.3) |
| 1 | -1.698 | 0.008 | 2.73 | (42.3) |
| 2 | -0.729 | 0.007 | 3.34 | (52.5) |
| 3 | 0.132 | 0.007 | 3.55 | (55.8) |
| 4 | 2.295* | | 5.13 | (77.0) |

*Notes.* * It is constrained; "__" it marks the value of MNSQ exceeds the range of (0.6, 1.4); "( )" It marks the $T$-value that exceeds the range of (-1.96, 1.96).

**Distribution Figure of Respondent's Ability and Item Difficulty**

Specifically speaking, as shown in Figure 2, we can find that, on the left, the "X" means that the ability distribution for respondents' while on the right it is the difficulty distribution of each item. Moreover, this histogram illustrates that the distribution of the respondents' achievement and items indicate their difficulty level. In this research, each "X" represents 26 respondents. And the respondent's ability distribution for all dimensions is to nearly satisfy the normal distribution. Therefore, we observed that the average ability of respondents' attitude is the largest, close to 1, the most of them are within the range from 0 to 2; the average ability of respondents' knowledge is the second largest, above 0, the most of them are in the range of -1 to 1; the average ability of respondents' skill is the third largest, lightly below 0, the most of them are in the range of -1.5 to 0.5. These three dimensions are very close, which indicates that the ability of these three dimensions of respondents is closed to each other. However, the average ability of respondents' experience is the smallest and has a great distance with the other 3 dimensions, nearly -2. Furthermore, we found that the average difficulty for all the items is around 0 with nearly normal distribution, and most of them are range with -1 to 1,which also indicates that the scienticity of the items design. However, there is still a space among items, which indicates that there is lack of items for the matching ability respondent to answer. Specifically, item 56 is the most

difficult item, which indicates that the respondent tended to select the low score option while 57 is the easiest item, which indicates that the respondent tended to select the high score option.

| | Knowledge | Skill | Attitude | Experience | Item |
|---|---|---|---|---|---|
| | | | X | | |
| 3 | | | X | | |
| | | | X | | |
| | X | | X | | |
| | X | | X | | |
| | | | XX | | |
| 2 | X | | XXX | | |
| | X | | XXX | | |
| | XX | X | XXXX | | |
| | XX | X | XXXXX | | |
| | XXXX | X | XXXXXX | | 56 |
| | XXXXX | XX | XXXXXXX | | 33 48 |
| 1 | XXXXXXX | XX | XXXXXXXXXX | | |
| | XXXXXXX | XXXX | XXXXXXXXXX | X | 31 |
| | XXXXXXXX | XXXX | XXXXXXXX | X | 18 |
| | XXXXXXXX | XXXXXX | XXXXXXXXX | X | 14 29 32 53 58 |
| | XXXXXXXXX | XXXXXX | XXXXXX | X | 15 19 28 37 49 51 52 55 |
| 0 | XXXXXXX | XXXXXXXXX | XXXXX | XX | 16 20 23 26 27 30 35 36 39 40 |
| | XXXXXXX | XXXXXXXXXX | XXX | XXX | 17 21 22 24 38 41 42 44 |
| | XXXXXX | XXXXXXXXX | XXX | XX | 25 43 44 46 47 |
| | XXXX | XXXXXXXXX | XX | XXX | 45 50 |
| | XXXX | XXXXXXX | X | XXXX | 34 |
| -1 | XXX | XXXXXXX | X | XXXX | 57 |
| | XX | XXXXX | | XXXXX | |
| | X | XXXX | | XXXXX | |
| | X | XX | X | XXXXXXX | |
| | X | XX | | XXXXXXX | |
| -2 | | X | | XXXXXXX | |
| | | X | | XXXXXX | |
| | X | | | XXXXXX | |
| | | X | | XXXXX | |
| | | | | XXXXX | |
| | | | | XXXXX | |
| -3 | | | | XXX | |
| | | | | XX | |
| | | | | XXX | |
| | | | | XX | |
| | | | | XX | |
| -4 | | | | X | |
| | | | | X | |

*Figure 2.* The distribution figure for respondents' ability and item difficulty (Each "X" represents 26.0 cases).

## Reliability Verification

As shown in Table 9, we observed that the knowledge has the closest relationship with skill among these dimensions with the correlation coefficient equals to 0.634 while the attitude and experience has the smallest correlation coefficient equals to 0.281, which is in accordance with the previous scholar's work. As we can see in Table 10, for each dimension, the EAP/PV reliability is larger than 0.74, indicating that estimates of respondent ability in each dimension have good precision.

Table 9

*Correlation Coefficient among Dimensions*

| Dimension | Knowledge | Skill | Attitude | Experience |
|---|---|---|---|---|
| Knowledge | | | | |
| Skill | 0.634 | | | |
| Attitude | 0.566 | 0.656 | | |
| Experience | 0.350 | 0.594 | 0.281 | |

Table 10

*Variance and EAP/PV Reliability of Each Dimension*

| Dimension | Knowledge | Skill | Attitude | Experience |
|---|---|---|---|---|
| Variance | 0.927 | 0.814 | 0.900 | 1.502 |
| Reliability | 0.784 | 0.779 | 0.806 | 0.741 |
| Numbers | 11 | 9 | 15 | 10 |

## Results and Findings

Based on the analysis from Rating Scale Model (RSM), for other dimensions, the items have the good fitness to respondents while the items of global experience are not fit to the respondents because the respondents are lacking in global experience while the average difficulty of the global experience items are larger than their ability; The expectation of respondent's global competency is significantly different from the actual situation; Respondents have the high ability in global attitude with the low ability in global experience; The ability of different category's respondents have significantly differences. It is the reason why it is very hard to enter the highest ability category. Fixing some items in the global experience dimension, concentrating on offering some items to fit the ability of respondents can be considered as effective approaches to improving the overall efficiency of Global Competency Assessment Questionnaire with Rating Scale. Additionally, based on the results, we find that the ability of respondents' experience is extremely low and we should fix some items in the global experience dimension. Moreover, since there is still a space in the item difficulty distribution, it is necessary to add some new items, which can fit the ability of respondents. In conclusion, the global competitive competency assessment scale for undergraduates in China is essential to cultivate global competency for graduate students in the contemporary China's higher education. It is also significant to enhance cross-cultural competitiveness and comprehensive competitive power. Specifically, this global competency assessment scale is a suitable assessment tool that measures the level of intercultural competency/sensitivity for the individual level for perceiving global cultural capacity in global culture context. The results indicate that the global competency assessment scale has strong predictive validity toward the bottom-line goals at an individual level.

## Limitations and Future Research Suggestions

The key limitation of this research is that the questions of the global experience section are more difficult than the actual ability/level of the respondents'. Hence, generating more effective approach concerning on how to design the questions in this part (Global Experience) is essential to measure the ability of the respondents' comprehensively. Moreover, the suggestion for the future research is to design some new questions of the global experience section that will meet the ability/level of the respondents by applying IRT method to re-test the validity and reliability of the whole scales. Additionally, in order to get in-depth understanding and

evaluating global competency scales, more and more fundamental research should be conducted to enrich the field of measuring different types of global competency for different goals and audience.

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# The "Futuring" Dilemma in Narrative Identity: A Longitudinal Study of Future Vocational Plans Among Italian Freshmen

Luigia Simona Sica, Laura Aleni Sestito

University of Naples "Federico II", Naples, Italy

The present study sought to explore the development of Psychology students' narrative vocational identity focusing on the future plans and expectations that led them to the choice of Psychology and identifying whether there are any developmental changes resulting from early experiences of university life. Written narratives produced by students were studied in two different moments: during the first week of university attendance and immediately after first session of exams. The participants consisted of 50 Italian psychology students, balanced by gender aged 18 to 21 years ($M_{age}$ = 19.65 years, $SD$ = 2.28). Narrative data of both Time1 and Time2 were analysed and compared through a content analysis focusing on rationale for the selection of studies; temporal models; sophistication; and vocational identity process. The results suggest that the future vocational plans have a crucial role in the vocational identity development. In this sense, the present study gives important information in order to suggest vocational intervention to enhance the future orientation of university students.

*Keywords:* futuring, vocational identity, narrative approach, longitudinal study, young adults

## Introduction

Choosing one's own working future and developing one's own vocational identity is a developmental task concerning young people in transition from late adolescence to adulthood (Porfeli, Lee, Vondracek, & Weigold, 2011). This process also is intertwined with the development, in a more global view, of personal identity (Luyckx et al., 2008) and it is affected in a concrete way by the historical, economic and cultural environment in which the individual grows. For these reasons, in some contexts particularly exposed to the economic crisis of recent years, this process has become more and more problematic and difficult, a source of discomfort and stress (Berman & Montgomery, 2014). Research findings documented for young people show that, even though they have decided to prolong their studies and invest in specialized post-graduate university studies and training courses, the presence of identity postponement (Crocetti, Rabaglietti, & Sica, 2012) in some cases is linked to identity distress and anxiety (Sica, Aleni Sestito, & Ragozini, 2014) and to a general sense of discomfort in future plans and present focusing (Adams, 2009; Leccardi, 2006). However, our question is how young people, in a context of poor career and work opportunities, can explore and commit their vocational identity and how they can build a clear sense of who they are and where they are going in their lives. Indeed, on the basis of this evidence a new problematic area of identity development could be identified for students in the intersection between vocational identity development, contextual occupational opportunities and personal time-perspective.

Luigia Simona Sica, Ph.D., Department of Humanities, University of Naples "Federico II".
Laura Aleni Sestito, Professor, Department of Humanities, University of Naples "Federico II".

This problematic area will be the object of the current study and we shall refer to it as "the futuring dilemma in narrative vocational identity development". The purpose of this study was to explore the processes leading to the choice of the individual's own future occupation and vocational identity achievement in contexts that are unattractive in terms of immediate employment opportunities, and to identify what factors may be involved in vocational identity achievement, in addition to what factors can be identified in a state of identity diffusion or moratorium. In doing so, we referred to the narrative identity paradigm.

**Defining Vocational Identity: A Developmental Task**

Vocational identity is conceived as a domain-specific aspect of identity as a whole, providing young people with a framework for the regulation of its objectives and at the same time for self-regulation (Hirschi, 2012). Vocational identity is, therefore, believe to be a defining feature in adolescent and young adult life and appears to be a central element of identity (Skorikov & Vondraceck, 2011) and the major component of one's overall sense of identity (Kroger, 2007; Skorikov & Vondraceck, 2007). People exhibiting an advanced identity-status show greater career planning and decidedness (Wallace-Broscious, Serafica, & Osipio, 1994) and a developing vocational identity appears to contribute to overall identity (Kroger, 1988; Skorikov & Vondracek, 1998), which was proposed by Grotevant (1987) and confirmed for the vocational domain (Meeus, 1993; Skorikov & Vondracek, 1998). Numerous studies also confirm the positive association between occupational identity and more general conceptions of identity in adolescence and young adulthood (Nauta & Kahn, 2007; Savickas, 1985). Empirical studies have found that the engaging in occupational exploration and making occupational commitments promote identity development from childhood through adulthood (Flum & Bluestein, 2006; Kroger, 2007; Skorikov & Vondracek, 2007). Work was found to be the primary influence on overall identity for college students, workers and unemployed (Danielsen, Loren, & Kroger, 2000).

Despite the general regularity of vocational identity development exhibited on the population level across the adolescent and early adulthood period, there exists a great deal of variability in terms of the pathways and timing of vocational identity progress. The nature of career progress is shifting away from a hierarchical series of roles/jobs within an employer yielding increased status and responsibility and moving toward a series of jobs/projects within and across employers. Career progress as a series of jobs and titles becomes re-defined as an ever expanding repertoire of skills and a multiplying professional network. This shift brings new opportunities and challenges associated with lifespan identity development.

**Narrative Identity: Meaning Making and Autobiographical Times**

The narrative identity approach places specific emphasis on individuals' subjective assessment of their personal experiences and the stories that they tell about them (McAdams, 1993). The autobiographical narratives enable individuals to structure their experiences in a format that facilitates subjective reflection, and thus, the process of making sense of life or of life's specific events, which is critical to identity development (Bruner, 1993; Kunnen & Bosma, 2000). This narrative "meaning making" has been proposed as one of the major processes by which identity is constructed and as behaviour that reflects the current state of an individual's identity (McLean, Pasupathi, & Pals, 2007). In this study we referred, in addition to the meaning making assumption, to the conceptualization of "autobiographical time" (Brockmeier, 2000) (see Table 1) which interprets identity as a result of the interaction process between continuity and discontinuity through time and space (Lichtwark-Aschoff, van Geert, Bosma, & Kunnen, 2008) and autobiographical discourse as the form

par excellence in which we give shape to the time of our life (Brockmeier, 2000; Sica, Brockmeier, & Aleni Sestito, 2010). In this sense, we agree with the idea that such an identity takes on the form of a well-structured story that explains "how the self of yesterday became the self of today and will become the self of tomorrow" (Savickas, 2005, p. 58).

Table 1

*Authobiographical Time and Narratives Models (see Brockmeier, 2000)*

| Authobiographical time | Narrative models | Developmental models | Description |
|---|---|---|---|
| In the process of autobiographical identity construction a particular synthesis of cultural and individual orders of time takes place. The result is autobiographical time, the time of one's life (Brockmeier, 2000, p. 51). | Several narrative models of autobiographical time, each suggesting a particular vision of the course and direction of time…. In aligning actions and events along long-term episodic structures, they give a meaningful diachronic order to a selected multitude of singular life events. Put the other way around, only by being integrated into a particular gestalt of order and coherence, life events become meaningful (Brockmeier, 2000, p. 61). | | |
| | | (a) Developmental models (linear, circular, cyclic, spiral) | They describe life as process, movement and, through them, the autobiography can be read as a place for a developmental organization of both time and experience. |
| | | (b) Not-developmental models (static and fragmentary) | They lack a development trajectory and they do not seem to contain dynamics of change: they are, essentially, "timeless". |

**Late Adolescents and Young Adults in Italy: Peculiarities of Mediterranean Countries**

In this study we refer to the particularly difficult job market that characterizes the Italian context for young people. Italy was chosen as a prototype of Southern European countries wherein young people's possibilities to develop coherent and fulfilling future plans are strongly threatened by the current socio-economic situation (Leccardi, 2006). The main problems that affect Southern European youth include high rates of unemployment (ranging approximately from 35% to 55%; Eurostat, 2015); large numbers of youth classified as "Not in Education, Employment, or Training" (NEET) (Bynner & Parson, 2002); widespread job precariousness (e.g., Cortini, Tanucci, & Morin, 2011); and a deep-rooted crisis of confidence in the social institutions (e.g., Pharr & Putnam, 2000). All these problems can be observed in the Italian context that is characterized by a particularly difficult job market for young people (Aleni Sestito, Sica, & Nasti, 2013). In fact, even after concluding their prolonged programs of study, these young people have been found to experience additional periods of instability, insecurity, and economic uncertainty (Berton, Richiardi, & Sacchi, 2009; Iezzi & Mastrobuoni, 2010; ISTAT[1], 2014).

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[1] The National Statistics Institute (ISTAT) is a governmental research organization. It has been in existence since 1926 and it is the main producer of official statistics in support of citizens and decision makers. It works independently and in continuous interaction with the academic and scientific worlds.

Given the challenging social and economic contexts in which Italian youth live, it is not surprising that we are noting changes in developmental pathways. For example, when compared to their Northern European peers, Italian late adolescents and young adults demonstrate a postponement of identity choices (Crocetti, Rabaglietti, & Sica, 2012; Sica, Aleni Sestito, & Ragozini, 2014). Furthermore, the image of the future as a controllable and governable time is shrinking, and as a result, "the present looks like the only temporal dimension available for defining choices, an authentic existential horizon that, in a certain sense, includes and replaces future and past" (Leccardi, 2006, p. 41).

A consequence of the unpredictable social and developmental context in Southern Europe, as in all contexts characterized by high levels of job insecurity, unemployment, and a general distrust in political institutions, family represents the main social safety net (Albertini & Kohli, 2013). In Southern Europe specifically, the family plays a central role in the welfare system, acting as the main provider of care and welfare for young people (e.g., familism, Saraceno, 2003); therefore, in Italy relationships with family are often considered more important than relationships with friends, and parents play a critical role in the identity development and future planning of their children (Aleni Sestito & Sica, 2014).

**The Present Study**

In the Italian context, despite the job market crisis, and specifically the uncertainty of job opportunities for psychologists, many students choose to enrol in the Psychology Faculty (as cited in ISTAT, 2013). The present study sought to explore the development of Psychology students' narrative vocational identity by focusing on the future plans and expectations that led them to the choice of Psychology, and by identifying whether there are any developmental changes resulting from early experiences of university life. Indeed, the purpose of the present longitudinal study was to explore the challenge of narrative vocational identity during their first year at university when freshmen face many new features that could activate processes of self-reflection, analysis and revision of the choices just made with a view to modifying or consolidating them. Based on the narrative approach (Pasupathi, Wainryb, & Twali, 2012), narratives produced by students were studied in two different moments, in other words Time 1 during the first week of university attendance, and Time 2 in the week after the first examinations session.

Specifically the research questions we posed were the following:

(1) Starting from such expectations and motivations, did students formulate their projects about psychology despite the specific difficulties in employment access?

(2) What changes were induced by university life experiences in the first semester?

(3) What are the processes by which Italian psychology freshmen develop their vocational identity?

We expected that during the time-frame between Time 1 and Time 2 freshmen have to face many new meaningful features that could activate processes of self-reflection, analysis and revision of their choices just made and commitment reconsiderations.

## Method

**Participants**

The participants consisted of 50 Italian university students, balanced by gender aged 18 to 21 years ($M_{age} =$ 19.65 years, $SD = 2.28$) who completed a two-wave longitudinal study. They were all students attending the first year of psychology university courses in a large Italian city. Participation in the study was voluntary and anonymity was guaranteed.

**Measure**

We used the following narrative prompt: Tell me the path that led you to choose this course of study: what projects, what hopes, what future.

## Results

Narrative data of both Time1 and Time2 were analysed and compared through a content analysis focusing on: (a) vocational choice in terms of rationale for the selection of studies and vocational identity process; (b) narrative identity in terms of planning for the future, autobiographical times and meaning making level (see Table 2).

Table 2
*Coding Template*

| Research questions | Category | Thematic category |
|---|---|---|
| Vocational choice | 1. Rational | Descriptive subcategory |
| | 2. Vocational Identity | Commitment<br>Explorations<br>Reconsideration: flexibility and self-doubt<br>(Porfeli et al., 2011) |
| Narrative development | 1. Autobiographical time | Balance<br>Past experiences<br>Futuring<br>Narrative models of autobiographical time<br>(Sica, Brockmeier, Aleni Sestito, 2010):<br>(a) Developmental models<br>(b) Not-developmental models |
| | 2. Meaning making | Scale 0 to 3 |

The content analysis revealed that all students referred to intrinsic motivation (see Figure 2).
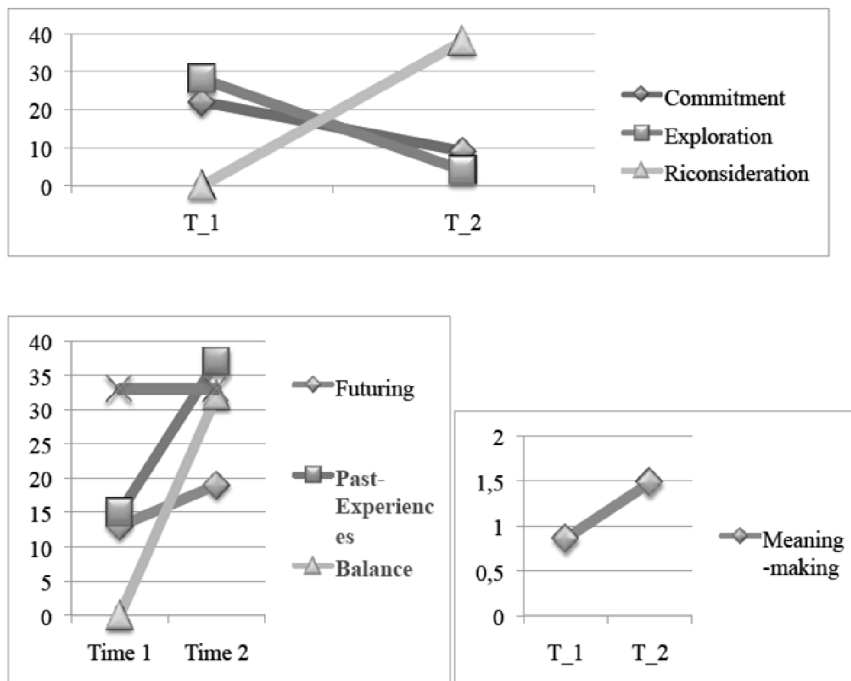




*Figure 1.* Vocational Identity dimensions, Autobiographical Time and Meaning Making in the two times of the study.
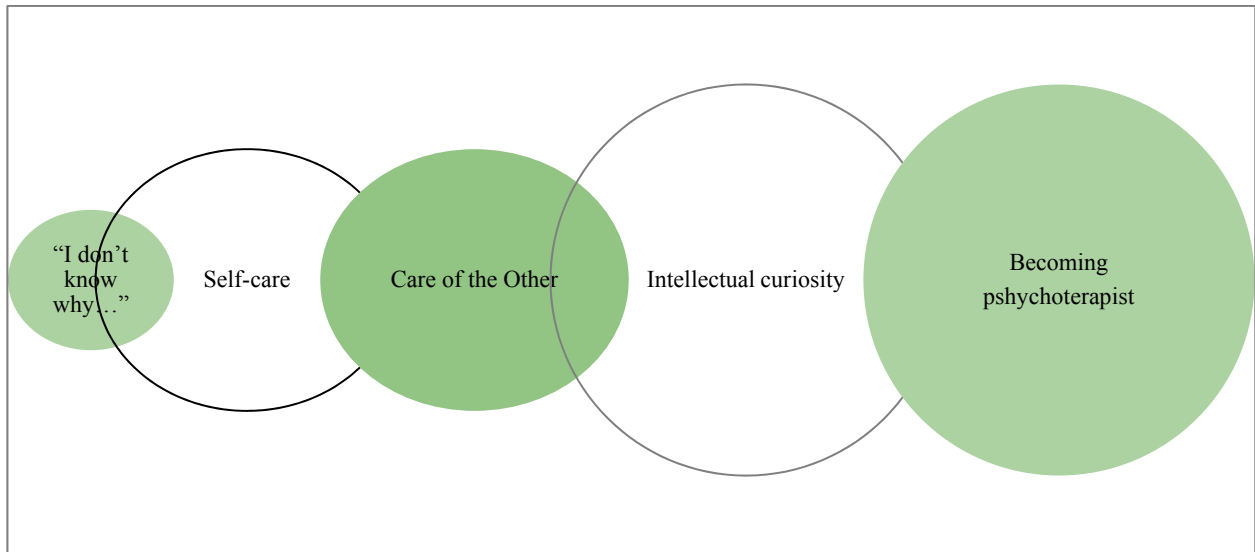
*Figure 2*. Rational for vocational choice: Intrinsic motivation.

Our results show that insofar as identity processes are concerned from Time 1 to Time 2, Commitment ($\chi^2$ = 7.22; Sig. = 0.007) and Exploration decreased ($\chi^2$ = 25.3; Sig. = 0.000) but Reconsideration processes (in terms of both Flexibility and Self-doubt) increased ($\chi^2$ = 54.65; Sig. = 0.00). The results have also shown significant increase in the dimensions of meaning-making. Autobiographical time resulted as developmental and did not show changes from time one to time two.

**Two Sides of Vocational Identity Development: The Coloured One and the Dark One**

The changes of the considered dimensions allowed us to identify two trajectories of vocational identity development differently characterized by the presence/absence of future vocational plans (Figure 3). Trajectory a. has a "positive" outcome; trajectory b. (in which no future plans were found) has a "negative" outcome in identity terms. Both trajectories, in turn, influence the kind (flexible or self-doubt characterized) of reconsideration in which students are still involved (Table 3).
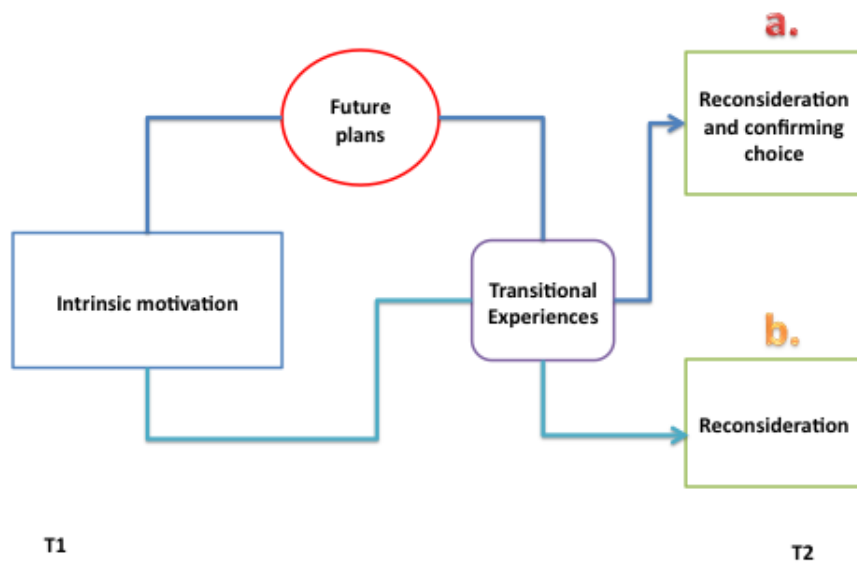


*Figure 3*. The trajectories of vocational identity development.

Table 3

*Narrative Examples of the Two Vocational Development Trajectories*

| Trajectories | Narrative excerpt |
|---|---|
| a. Reconsideration and confirming choice | At the start I had a clearer picture of my goals and the work I wanted to do, but since I've been at university a whole new world has opened itself up to me... While before the only thing I had in mind was the figure of a psychotherapist, now I have a much wider view. I think I need more time; but for the moment I aim to study hard in order to achieve my dream (F, T2) |
| b. Reconsideration with self-doubt | The choice I'm following was not carefully thought through, nor the result of a long process. I was obliged to make a choice because time was running out.... Today I can say that I find the subject matter very stimulating, but my fears are still there. Above all I don't feel I can see a clear hope for the future simply because I just don't know what to hope for, and I don't know who I want to become or who I can become... (F, T2) |

## Discussion and Clinical Implications: How This Study Provides a Better Understanding of Problematic Identity Formation

This contribution was designed to shed light on development of Psychology students' narrative vocational identity by focusing on the future plans and expectations that led them to the choice of Psychology, in a longitudinal perspective. In order to do that, we adopted a narrative approach to explore the meaning making processes that the transitional phase in which students are involved could activate. Findings show three main interesting results: the modification of identity processes during the transition considered; the crucial role of futuring on the definition of vocational identity and the presence of two different trajectories; the prevalence of intrinsic motivation for psychology choice.

First, results showed that the new relational and individual experiences offered by university context have an impact on vocational identity processes of participants. Specifically, an increasing of identity reconsideration processes was found. This result is in line with the development of identity processes during biographical transition that are significant for the balance between plans and actual experiences. More specifically, the increasing of reconsideration processes accords with the results of Italian researches that showed that a large fraction of the university students were classified in the searching moratorium and undifferentiated vocational identity statuses perhaps because they continue to wrestle with establishing a sense of self at work in a socio-economic context that has very limited work opportunities. Within a university system in which all the students in this study had chosen a college major, these results suggest that only a fraction of these had committed to a career. This discrepancy between academic and career commitments speaks to the increasing lack of confidence that Italian young adults have in an educational system that presently leads to very limited work opportunities (Aleni Sestito et al., 2015; Sica et al., 2014).

Second, based on the described results, future vocational plans seem to have a crucial role in vocational identity development. In this sense, the present study suggests vocational support schemes to enhance the future orientation of students and their skill in planning their future occupation in order to prevent identity irresolution and negative reconsideration, as well as to support flexibility and identity achievement. Indeed, the current study reveals the crucial role of "futuring" (the capacity to make future plans; Sica, Crocetti, Aleni Sestito, Ragozini, & Serafini, 2016) in self-definition. This evidence supports the contention of identity research that emphasizes the importance of the identity exploration and the orientation to the future to support vocational and occupational future choices (Oyserman, Bybee, Terry, & Hart-Johnson, 2004).

Third, it could be interesting to note that, in times of economic and employment crisis, the motivation involved in choosing the vocational trajectory is "intrinsic". However, intrinsic motivation is not enough. Students need to make future plans in order to reconsider, explore and confirm their vocational identity. Otherwise this intrinsic motivation seems to be an unrealistic aspiration that may not be strong enough to resist comparison with reality. However, we believe students are still evolving: they are still involved in identity formation and their autobiographical models are all developmental.

According to the above evidence, we suggest that practical programmes of identity-confusion prevention for university students could focus on future orientation improvement and identity development support, specifically allowing and supporting them in their ability to shape a personal project and a realistic vision of vocational possible selves. As described by the two trajectories, the ability to shape their own projects could impact on the outcome of identity reconsideration in transitional moments. Planning themselves for the future provides students with the support to create their vocational identity without identity distress.

## Limitations and Future Direction of Research

At the moment, the study described here has a number of limitations because it is the first step of a larger research programme. Firstly, in this paper we presented data of only psychology students. In the next step of our research the data from a broad sample of students will be examined to frame the study within general problems in the job market in Italy. Furthermore, we used two steps for data collection in this paper, and now we are analysing the third set of data already collected, in other words Time3. Despite these limitations, the current findings have many important conceptual and practical implications. First, the current study provides support for counseling initiatives to help individuals design and redesign their lives (Collin & Guichard, 2010). Specifically, our findings indicate that university students need support to develop their identity and plan their future in an adaptive way (Sica et al., 2014). These findings also advance the literature, confirming there is a link between identity formation and difficulties in university students in Italy (Sica et al., 2014). They point to the need to specifically target identity formation processes for the prevention of academic difficulties, developmental moratorium and psychological distress. This suggests that particularly for students who are unable to capitalize on the opportunities presented by the university context, intervention programs may be necessary to promote identity consolidation, the exploration of possible selves (Sica, 2009) and the identification of adult roles and commitments. In this sense, our results support the specificity of identity construction and career development initiatives for young adults as planned in the international context (Guichard, Pouyaud, de Calan, & Dumora, 2012).

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# The Development and Validation of a Measure of Career Integration in College Students

William B. Davidson
Angelo State University, San Angelo, USA

Hall P. Beck
Appalachian State University, Boone, USA

A measure of career integration was developed and administered to 3,258 students enrolled in baccalaureate programs at five universities in the United States. Principle component analysis of scores indicated that the initial pool of 11 items could be meaningfully explained by one substantial factor. The five highest loading items were retained for further analyses, forming an internally reliable scale. Using the original sample of students and their scores on other relevant variables, the measure of career integration was validated by its association with degree commitment, and its incremental validity was confirmed with hierarchical regression after controlling for two other prominent types of integration, academic and social. Also, the relationship between the career integration measure and degree commitment was substantial in both lower-level as well as upper-level students. The implications for retention are discussed.

*Keywords:* career integration, scale development, college student retention, career counseling, degree commitment

Academic and social integration are two of the most important determinants of college student success and persistence (Braxton & Mundy, 2001-2002). The central focus of the two qualities is the students' feelings of compatibility and satisfaction with the school they are attending. In the case of academic integration, the feelings are based on attitudes toward the curriculum, instruction provided in courses, and the attainment of scholastic standards. Social integration, on the other hand, entails satisfaction with the people encountered at the school and feelings of belongingness.

Tinto first proposed the significance of academic and social integration (reviewed in Tinto, 1993). His ideas launched an impressive body of empirical inquiries; many of the subsequent models of student success and persistence included his two forms of integration, as well as a host of other variables (for reviews, see Braxton & Hirschy, 2005; Cabrera, Nora, & Castaneda, 1993; Davidson, Beck, & Milligan, 2009). This literature is too voluminous to be reviewed here, but a common theme is the connection between integration and several important outcomes, such as the students' commitment to earning a degree, their commitment to their college or university, and their persistence along the path to the degree.

In addition to the two forms of integration posited by Tinto and tested in subsequent models, a third form of integration, career integration, has been proposed as a crucial factor in students' development and persistence (Ashar & Skenes, 1993; Hirschy, Bremer, & Castellano, 2011; Phelps, 1996). Briefly stated, this construct is the students' sense of compatibility between what they are learning in and out of the classroom and their

William B. Davidson, professor, Ph.D., Department of Psychology, Sociology, & Social Work, Angelo State University.
Hall P. Beck, professor, Ph.D., Department of Psychology, Appalachian State University.

employment aspirations. Specifically, this quality reflects the students' beliefs that the training and experiences being provided by the school will yield many positive employment benefits. In his review of nine themes of college student retention, John Bean (Bean, 2005) underscores the importance of students, ".... thinking that one's education will lead to employment. The practical value of an education comes from learning skills or getting good grades in courses that will provide access to jobs requiring these skills. Students who make no connection between what they study and their future plans for employment are less likely to .... fit in" (p. 222).

The development of students' career knowledge and readiness has been addressed in a variety of ways, including internships, volunteer opportunities, job fairs, mock interviews, psychological and career assessments, and career workshops. Most schools have a Career Services Office, which bears much of the responsibility for students' career development (for review, see Vinson, Reardon, & Bertoch, 2014), and some schools offer a general careers course to lower-level students (Folsom, Peterson, Reardon, & Mann, 2005; Grier-Reed & Chahla, 2015). Recently, an assessment tool was validated that evaluates how well students have progressed in pursuing information about careers and forming a career identity, the Occupational Engagement Scale—Student (Cox, Krieshok, Bjornsen, & Zumbo, 2015). The content of this nine-item scale addresses career growth in activities outside the classroom.

We note two gaps in the conceptual and empirical development of the concept, "career integration". First, a validated measurement tool for the quality as it develops in the classroom has not been forthcoming. Arguably the most important preparation for careers takes place in the students' major courses. Informal observation suggests that major courses often include career information, and that there is a need to assess the students' attitudes about the career relevance and utility of what they are learning in the classroom.

Second, though some investigators have discussed the association of course material and career integration, these articles have focused on limited populations, either two-year occupational programs (Hirschy, Bremer, & Castellano, 2011), doctoral programs (Phelps, 1996), or baccalaureate courses for non-traditional students (Ashar & Skenes, 1993). Clearly, the usefulness of the concept of career integration would be enhanced by the development of a validated scale applicable to baccalaureate programs in general.

The validation of a measure of career integration in college students entails testing its association with other theoretically-expected characteristics. Models of self-regulation and the pursuit of goals offer a useful framework for identifying a relevant characteristic (for review, see Gollwitzer & Oettingen, 2013). When people set long-term goals and pursue them, their striving and persistence is determined by, among other things, the sense of efficacy that progress is being made and that the steps taken will eventuate in goal attainment. Students in higher education predominantly set the goals of (a) earning a degree and (b) obtaining a desirable career. The former is perceived as a qualification for the latter, so the steps taken to attain one are expected to also secure the other. In other words, their studies should not only earn a degree but also prepare them for a good career. Therefore, the strength of their commitment to earning a degree should be enhanced by its career-relevance.

If there is a relationship between career integration and degree commitment, a follow-up question is whether the association exists in both lower-level and upper-level students. This is an important consideration because, typically, most of the courses taken by students in the first two years are general education or core curriculum, whose career relevance may not be as apparent as courses taken later in the students' major. If the relationship among lower-level students is as strong as it is among the advanced students, it would have

meaningful implications for infusing lower-level courses with examples of career applications and the career-relevance of topics.

The purposes of the current study are to: (1) develop a reliable, valid measure of career integration which includes course-relevant items; (2) test the association of the scale with degree commitment; (3) determine if the relationship between career integration and degree commitment holds for lower-level students (freshmen and sophomores) and upper-level students (juniors and seniors); and (4) investigate whether the new career integration scale explains variance in degree commitment beyond that which is accounted for by academic and social integration.

## Method

### Participants

The participants were 3,258 students enrolled in baccalaureate programs at five universities located in the United States. The sample included 2,164 freshmen, 428 sophomores, 418 juniors, and 248 seniors. There were 2,135 females and 1,123 males. The ethnicities were 2,367 Caucasians, 350 Hispanics, 216 African-Americans, 161 Asians, 15 Native Americans, and 149 students who classified themselves as "Other Ethnicity".

### Measures

We wrote 11 objective items to measure career integration, answered and scored on a five-point Likert scale. The items assessed the students' perception of a connection between the courses and various aspects of future employment such as its availability, required skills, enjoyment, financial compensation, and being successful. Other items queried the students' amount of knowledge of careers, their level of commitment to a career, the relevance of the training, and the role of a career in their personal happiness and identity.

Also, we administered three relevant scales from the College Persistence Questionnaire (CPQ) (Davidson, Beck, & Milligan, 2009; Davidson, Beck, & Grisaffe, 2015), Degree Commitment, Academic Integration, and Social Integration. Each of the CPQ scales is composed of three objective items that are answered and scored on a five-point Likert scale. Previous research has established their reliability and validity (Davidson et al., 2015). Even though the scales are brief, they had acceptable levels of internal reliability in the current study ($\alpha$): Degree Commitment = 0.79, Academic Integration = 0.77, Social Integration = 0.77.

### Procedure

The questions were administered online after the sixth week of the current semester. The incentives offered to students for participation varied depending on the school. Some received extra credit in courses, some fulfilled a course requirement in freshmen seminars, and others volunteered without an incentive.

Participants first answered several demographic questions, including their sex, ethnicity, and academic classification. The remaining 20 items were then administered. Students were treated in accordance with the American Psychological Association Guidelines for Ethical Conduct (American Psychological Association, 2010). Approval to conduct the research was also obtained from local Institutional Review Boards.

## Results

The data were analyzed in four stages. First, a principle component analysis was performed on the 11 career integration items in order to find the best set for a scale. After an oblimin rotation, the analysis yielded two factors with eigenvalues greater than 1.0: 4.58 and 1.28 that explained 41.56 and 11.62 percent of the variance,

respectively. A screeplot indicated that there was only one substantial factor, so we focused on it and conducted another principle component analysis on the five highest-loading items. These five items had the following loadings in the final analysis: optimism that training imparts necessary knowledge, 0.83; certainty that training will lead to enjoyable employment, 0.85; likelihood that training will eventuate in preferred job, 0.86; confidence that training will qualify for good-paying job, 0.83; and belief that training imparts necessary skills, 0.85. Scores on these five items were summed to form the Career Integration scale. The internal reliability coefficient ($\alpha$) of the Career Integration scale was 0.90.

In previously-cited modeling studies, Degree Commitment was considered to be an outcome of the integration variables. Therefore, the second stage of the analyses was to calculate the bivariate correlations between Degree Commitment and scores on the three types of integration: Career Integration, $r(3258) = 0.42$, $p < .001$; Academic Integration, $r(3258) = 0.35$, $p < .001$; and Social Integration, $r(3258) = 0.20$, $p < .001$. The direction of the relationships indicated that favorable scores on each type of integration variable were statistically associated with favorable scores on Degree Commitment.

Given the relationship between Career Integration and Degree Commitment, the third stage in the analysis was to examine whether the association existed among both lower-level and upper level students. We calculated correlation coefficients separately for the two groups: lower-level (freshman and sophomores) $r(2592) = 0.44$, $p < .001$; upper-level (juniors and seniors) $r(666) = 0.38$, $p < .001$.

The bivariate correlations established reliable relationships between Degree Commitment and the three integration variables. The fourth and final stage in the analyses was to determine whether Career Commitment accounted for variance in Degree Commitment that could not be explained by the other two integration variables, which would establish its incremental validity. This was tested with hierarchical regression on Degree Commitment scores. Academic and Social Integration were entered in the first block and Career Integration was entered in the second block. The first block yielded, $F(2, 3225) = 251.68$, $p < .001$, $R = 0.37$, $R^2 = 0.14$, and the second block produced, $F(3, 3224) = 283.75$, $p < .001$, $R = 0.46$, $R^2 = 0.21$. The change in $R^2$ from the first block to the second was statistically significant: $F(1, 3224) = 301.05$, $p < .001$, $R = 0.27$, $R^2 = 0.07$. Therefore, the regression analysis established the incremental validity of the Career Integration scale. In the full model, the standardized regression coefficients ($\beta$) for the three predictors were 0.18 (Academic Integration), 0.06 (Social Integration), and 0.32 (Career Integration).

## Discussion

The purposes of the study were achieved. An internally reliable measure of career integration was developed, and its validity was verified. The measure was valuable in exploring and confirming the relationship with students' commitment to earning a degree, with both lower-level students as well as upper-level students. Not only did the results confirm this relationship, but they also affirmed the incremental validity of the measure of career integration after controlling for two other types of renowned integration, academic and social. The findings support the inclusion of the career integration construct in future models of student success and retention.

Several key aspects of the new measure of career integration will be attractive to other researchers in exploring hypotheses about this quality. It is brief, reliable, valid, and easy to administer and score. The Career Integration scale can be used as a standalone index or in combination with measures of many other variables to establish anomological network around college student outcomes of interest.

The results of this study have applied utility for instructors, program administrators, and career counselors. The Career Integration scale validated in this paper enables instructors to assess the extent to which their students perceive compatibility between the course material and their employment objectives. Aggregate data supplied by the Career Integration scale gives administrators an empirical tool for evaluating how effectively this key construct is incorporated into their programs. And career counselors can use scale scores to pinpoint specific areas of dissatisfaction in individual students and address them.

Our findings suggest that concerns over career integration are not restricted to students approaching graduation. Colleges and universities abiding by the results of this investigation would seek to improve the degree commitment and retention of their students by cultivating career integration at the freshman-sophomore as well as the junior-senior levels. Although the correlational methodology of this study does not establish causal relationships between the variables, the results are consistent with causal models that propose degree commitment has direct and indirect relationships with the students' persistence (e.g., Davidson et al., 2015; Robbins et al., 2004).

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