Learning and Individual Differences 19 (2009) 513–517

Contents lists available at ScienceDirect

Learning and Individual Differences

journal homepage: www.elsevier.com/locate/lindif

Self-efficacy beliefs and mental time travel ability: Uncovering a hidden relationship in educational settings ☆

Altay Eren *

Abant İzzet Baysal University, Department of Educational Sciences, Faculty of Education, Gölköy Campus, 14280 Bolu, Turkey

ARTICLE INFO

Article history:
Received 20 December 2008
Received in revised form 28 May 2009
Accepted 3 June 2009

Keywords:
Mental time travel ability
Self-efficacy beliefs
Student teachers
Teacher education

ABSTRACT

The aim of this study was threefold: first, it was to explore the profiles of student teachers' mental time travel ability; second, it was to examine the relationship between student teachers' mental time travel ability and self-efficacy beliefs; and third, it was to investigate the role of self-efficacy beliefs in relationship between the past and future dimensions of mental time travel ability. Based on the survey method, a total of 260 student teachers participated in the study. Results showed that student teachers' mental time travel ability can well be classified under the headings of high mental time travel ability, medium mental time travel ability, and low mental time travel ability. Results also revealed that student teachers' self-efficacy beliefs vary as a function of their mental time travel ability. More importantly, self-efficacy beliefs played a significant mediating role in relationship between teaching-related past events and teaching-related possible future events. Overall results of the present study suggest that the relationship between mental time travel ability and self-efficacy beliefs makes sense in educational settings.

1. Introduction

Individuals' mental time travel ability (MTTA) and teachers' self-efficacy beliefs (SEBs) are two important research topics both of which have been considered separately in different contexts; MTTA in neuropsychology and SEBs in teacher education, along with various conceptions such as episodic future thinking and teacher efficacy (Atance & O'Neill, 2001; Gurvitch & Metzler, 2009; Hardré & Sullivan, 2008; Suddendorf & Busby, 2005; Tulving, 1983; Woolfolk Hoy & Spero, 2005).

Although the previous research demonstrated that the future time perspective (FTP) was significantly linked to important educational variables such as student motivation, academic achievement, and SEBs (e.g., Cross & Markus, 1994; Malka & Covington, 2005; Peetsma, 2000; Shell & Husman, 2008), none of these studies considered these concepts with regard to students' MTTA. Unlike the FTP that refers to individuals' conceptions about the future (Husman & Shell, 2008; Seijts, 1998), the MTTA "refers to the faculty that allows humans to mentally project themselves backwards in time to re-live, or forwards to pre-live, events" (Suddendorf & Corballis, 2007, p. 299).

Accordingly, the MTTA provides a solid basis for both traveling mentally into the future by imagining possible future events and into the past by remembering subjective past events, whereas the FTP provides a solid basis for setting personal goals and planning life spans, exploring future options, and carrying out major decisions (Leonardi, 2007). In fact, 'Time Perspective,' as a comprehensive concept that also captures the FTP, refers to "a process whereby individuals and cultures assign the flow of personal and social experiences into the temporal categories of past, present or future, that help to give order, coherence and meaning to those events" (Zimbardo & Boyd, 1999, p. 1271; see also Zimbardo & Boyd, 2008), but not refers to a process that comprises re/pre-experiencing of the past/future-related personal events. Since the scope of the present study is to examine the interrelationships in student teachers' episodic memories of which the MTTA is the main function and their SEBs, the MTTA was considered as a crucially relevant concept.

Relevant research demonstrated that MTTA comprises phenomenal characteristics such as sensorial, contextual, and emotional details (D'Argembeau & Van der Linden, 2004, 2006; Rubin, Schrauf, & Greenberg, 2003). Research also showed that MTTA is a crucial individual difference variable that is related to other human characteristics such as personality (Quoidbach, Hansenne, & Mottet, 2008) and personal goal system (Conway, Meares, & Standart, 2004). As such, MTTA allows the representations of possible future states of the self, based on the episodic memories that are linked to personal goals (Conway, 2009).

When compared to MTTA, on the other hand, much has been said on teachers' SEBs (Brophy, 1979; Gurvitch & Metzler, 2009; Huang, Liu, & Shiomi, 2007; Milner & Woolfolk Hoy, 2003; Ross, 1992). However, less is known about the sources of teachers' SEBs (Tschannen-Moran & Woolfolk Hoy, 2007; Usher & Pajares, 2009). Based on the proposition of Bandura (1997) that SEBs developed from four sources of information such as mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states, Tschannen-Moran and Woolfolk Hoy (2007) examined two of these potential

☆ Note: This manuscript has not been published and is not under consideration elsewhere.

* Tel.: +90 374 254 10 1642; fax: +90 374 253 45 6.
E-mail address: eren_a@ibu.edu.tr.

1041-6080/$ – see front matter © 2009 Elsevier Inc. All rights reserved.
doi:10.1016/j.lindif.2009.06.002

sources: verbal persuasion and mastery experiences. They found that mastery experiences — i.e., those referring to "efficacy information gained from an individual's performance on a particular task" (Labone, 2004, p. 343) — made the strongest contribution to both beginning and career teachers' SEBs.

As emphasized earlier, these two topics have not been examined together in a study to date. MTTA, however, is an important variable that has potential to explain other important educational variables such as SEBs. For example, it has long been known that episodic memory is a source of beliefs (Nespor, 1987; Pajares, 1992; Rubin et al., 2003), suggesting that student teachers' SEBs are not completely independent from episodic memories of which MTTA is the main function. Also, Calderhead and Robson (1991, cited in Pajares, 1992) found that student teachers held vivid images of teaching from their experiences as students, which, in turn, played a powerful role in determining the practices they would undertake as teachers (see also Nespor, 1987). In the same vein, Pajares (1992) argued that critical past episodes such as a crucial experience(s) that enables student teachers to create vivid episodic memory may serve as a precursor to their later teaching behaviors. These studies are important because they signify that student teachers' SEBs do not necessarily relate to only the present time. In other words, these studies point out that student teachers' SEBs are both affected by their past-related educational events and affect their future-related possible educational events. Based on the conclusions of such studies, it can be said that it is reasonable to examine the relationship between student teachers' SEBs and MTTA in educational settings such as teacher education.

Thus, this study aimed to (a) explore the profiles of student teachers' MTTA; (b) examine the relationship between student teachers' MTTA and SEBs; and (c) investigate the role of SEBs in relationship between the past and future dimensions of MTTA. Based on this aim, three research questions were formulated as follows:

1-) What are the profiles of student teachers' MTTA?
2-) Do student teachers' SEBs significantly differ as to their MTTA profiles?
3-) Do student teachers' SEBs play a significant role in the relationship between the past and future dimensions of MTTA?

Given the explorative nature of this study, it is difficult to suggest specific hypotheses. Nevertheless, in the light of the explanations above, it can be said that a significant relationship between student teachers' MTTA and SEBs would not be surprising. Similarly, significant relationships among student teachers' past-related educational events and future-related possible educational events would also be expected (Pajares, 1992). These past-related personal events and future-related possible subjective events only make sense if they can be constructed or retrieved adequately, which depends on an individual's MTTA. Thus, it might be expected that significant and differential effects on SEBs are due to the individual differences in student teachers' MTTA. Finally, it can also be hypothesized that student teachers' SEBs play a significant mediating role in the relationship between past-related educational events and future-related possible educational events, due to the possibility that SEBs may filter the effects of past-related subjective events on future-related possible events (Bandura, 1997).

2. Method

2.1. Participants

Based on the survey method, a total of 260 student teachers (156 females), majoring in mathematics teaching ($n=90$), music teaching ($n=81$), and special education teaching ($n=89$) in a large university located in the North-West of the Black Sea Region in Turkey, voluntarily participated in the study. The sample of this study consisted of 56 first-year, 65 second-year, 65 third-year, and 74 final-year students. Participants ranged in age from 17 to 29 years ($M=20.96$, $SD=2.02$).

2.2. Research instruments

All items in the scales were translated into Turkish by the researcher with the assistance of two lecturers in the foreign languages department of the university where the present study was carried out.

2.2.1. The Teacher Efficacy Scale for Prospective Teachers

The SEBs subscale of the Teacher Efficacy Scale for Prospective Teachers (TESPT) (Denzine, Cooney, & McKenzie, 2005) was used to assess student teachers' SEBs due to the scope of this study. The SEBs-Scale has three items (e.g., if one of my students could not do a class assignment, I would be able to accurately assess whether the assignment was at the correct level of difficulty) with possible scores ranging from 3 to 18. Participants rated their responses on a six-point scale ranging from 6 (*strongly agree*) to 1 (*strongly disagree*).

As shown in the structural equation modeling (SEM) analysis section, the SEBs, as a latent variable, significantly predict its exogenous variables, with considerable loadings ranging from .58 to .73. This can take as evidence for structure validity of the SEBs-Scale. The internal reliability of the scale was computed as .70 in the present study.

2.2.2. The mental time travel scale

Based on the previous research (D'Argembeau & Van der Linden, 2006; Rubin et al., 2003), a Mental Time Travel Scale (MTTS) was developed to assess student teachers' MTTA. Thus, 10 past and future-related items were imported from previous research each of which was related to re/pre-experiencing the subjective events, traveling in time, seeing, hearing, and feeling the emotions. Both "teaching" and "learning" concepts were determined as two specific cues for those items in the MTTS because they are the most important concepts or signifiers in teacher education.

Participants were asked to remember one personal and positive teaching-related past event (e.g., a memory about their teaching process in which they were the main agents — how they were taught in the past) as well as one personal and positive learning-related past event (e.g., a memory about their learning process in which they were the main agents — how they learned in the past). Participants were also asked to imagine subjective and positive possible future events in the same manner.

The items were partitioned and replicated accordingly in order to obtain five well-evidenced manifest variables for each dimension of the MTTS, i.e., teaching-related past events (TPEs), teaching-related possible future events (TFEs), learning-related past events (LPEs), and learning-related possible future events (LFEs). Participants rated their responses on a 7-point scale ranging from 7 (*completely*) to 1 (*not at all*) so that the higher the score the higher the MTTA. Unlike the previous studies (e.g., Rubin et al., 2003), participants were asked to remember/imagine only the most important and positive teaching/learning-related past/future events in order to control the effects of both the importance and the valance of those personal events remembered/imagined by the participants. In addition, they were also asked to rate the time of their personal events. A total of 13 temporal categories such as today, yesterday/tomorrow, one week ago/later, one month ago/later, one year ago/later, five years ago/later, and ten years ago/later were defined for each teaching/learning-related past/future events.

Exploratory Factor Analysis with promax rotation method (cut off .45) revealed that the first, second, third, and the fourth factors explained 40.00%, 9.67%, 7.05%, and 4.17% of the variance respectively. Four factors together explained 60.89% of the total variance. Items and their factor loadings were presented as pattern matrix in Table 1.

The CFA results revealed that the four-factor model has acceptable fit to the data ($\chi^2(128)=312.37$, $p<.001$, $\chi^2/df=2.44$ (≤ 3); RMSEA = .075 ($\leq .08$); CFI = .944 ($\geq .90$); GFI = .891($\approx .90$)) (Bollen & Curran, 2006; Ullman, 2007). Alphas were .85, .88, .90, and .89 for TPEs, TFEs, LPEs, and