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The Role of Temporal Intelligence in Language Learners' Self-regulation and Self-efficacy

Abstract: The aim of the present study was to explore the role of temporal intelligence in English as a Foreign Language (EFL) learners' self-regulation and self-efficacy. To this end, a general temporal intelligence (GTI-S) scale was designed based on the subconstructs of time in the literature. The scale, along with the learning self-regulation questionnaire (SRQ-L) and the English self-efficacy scale was administered to 520 EFL learners. To validate the GTI-S, confirmatory factor analysis (CFA) was run. The results of Pearson product-moment correlations demonstrated significantly positive relationships between temporal intelligence and controlled self-regulation, automatic self-regulation and self-efficacy ($p < .05$). Moreover, the findings of multiple regressions revealed that Linearity of Time, Economicity of Time, and Multitasking are the most important subconstructs of time with relation to these variables.

Keywords: temporal intelligence, automatic self-regulation, controlled self-regulation, self-efficacy, EFL learners

Introduction

The focus on individual differences in language education has been a recurring theme in the last decades (Ellis, 2008). Research on the role of different types of intelligence in both language teaching and learning has enjoyed a popular trend in the past years. Traditional intelligence quotient (IQ) was founded on the idea that intelligence is a single, unchanged, inborn capacity. From this point of view, "intelligence (g) can be described as the ability to deal with cognitive complexity" (Gottfredson, 1998, p. 24). Predicting individual differences in educational outcomes was the justification for the first broad test of cognitive ability. The discovery of general intelligence involved, in part, using individual differences in school examination scores (Spearman, as cited in Deary, Strand, Smith, & Fernandes, 2007). Alongside occupational outcomes (Schmidt & Hunter, 1998, as cited in Deary, Strand, Smith, & Fernandes, 2007), educational outcomes were the major target for the predictive validity of cognitive ability tests. Therefore, the concept of intelligence was initially considered a one-dimensional, unitary entity which could be determined by a single number from a single test which mainly measured the linguistic-mathematical ability of individuals. However, Gardner (1985) proposed a view

of natural human talents, labeled "Multiple Intelligences Model" by noting that traditional IQ tests measure only logic and language, yet the brain has other equally important types of intelligence. In spite of the criticisms made at Gardner's Multiple Intelligences theory, such as arguing that it has no validating data (see Waterhouse, 2006), or that the multiple intelligences always work together in practice meaning that the system as a whole is one single intelligence (Klein, 1997), the theory has remained popular among scholars. Apart from the intelligences proposed by Gardner (1993), i.e. linguistic, logical/mathematical, spatial, musical, bodily/kinesthetic, interpersonal, intrapersonal, and naturalistic, other forms of intelligence have been introduced, such as emotional intelligence (Salovey & Mayer, 1990), spiritual intelligence (Zohar, 1997), narrative intelligence (Randall, 1999), metaphorical intelligence (Littlemore, 2001), cultural intelligence (Earley & Ang, 2003), and temporal intelligence (Clemens & Darlymple, 2005).

Time-related individual differences is a multi-dimensional construct which takes account of individual behaviors, cognition and affect related to time (Francis-Smythe & Robertson, 1999). According to Ancona, Okuysen, and Perlow (2001), a temporal framework involves three separate categories with a set of inter-

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relationships between these categories: conceptions of time (based mostly on culture), mapping activities to time (related to both situations and tasks), and actors relating to time (i.e., their individual beliefs, behaviour, and adjustment). Therefore, individuals have their own attitudes to time and time management, which result from their personality traits and also from the particular national/cultural group in which they have been raised. “Temporal intelligence” was first introduced by Clemens and Darlyrmp (2005) to describe the importance of time in leadership, notably its role in decision making and influencing followers. It refers to a leader’s cognitions and behaviors related to time with reference to the self and the individuals that he or she is responsible for leading (Doyle & Francis-Smythe, 2009). In this study, temporal intelligence is conceived by accumulating all the different subconstructs of time and thus applying it to all groups and individuals. Being time-talented certainly has positive and constructive effects on success in all fields. The field of education, and specifically language education, is no exception.

Learning English has become a necessity nowadays, calling for speed in learning to reach the required credits as soon as possible. Moreover, the educational systems foster an increasingly competitive environment, with exams that require not just knowledge, but skills in test performance (Pishghadam & Naji Meidani, 2011), which include time-related characteristics. In fact, language tests are one of the most time-sensitive forms of assessment. Lack of time management skills results in test anxiety and naturally, poor performance. Many language tasks require time organization and management or involve the issue of preparation or improvisation. Also, time management is part of metacognition (Ellis, 2008), which “may be the major factor in determining the effectiveness of individuals’ attempts to learn another language” (Chamot & O’Malley, 1994, p. 372). Metacognition involves planning learning, monitoring the process, and evaluating it (Ellis, 2008). Sometimes, students’ poor performance is based on factors apart from the material being studied and relates to their inability to function well metacognitively, while it may create misconceptions about their learning abilities. Moreover, time is an important issue in language learning. Considering that learning English is essential these days, the faster this process takes place, the better. In some cases, such as the International English Language Testing Service (IELTS) and the Test of English as a Foreign Language (TOEFL) examinations, learners have limited time to obtain the necessary score, which highlights the importance of temporal intelligence. In the process of language learning itself, temporal intelligence may be effective in learning temporal markers, such as verb tenses. In view of the direct relationship that exists between language and cognition (Vygotsky, 1986; Whorf, 1956), perhaps those who are more sensitive to time can learn temporal markers in a language better than others. Overall, although other types of intelligence have been devoted considerable attention in the field of language learning, there are no studies which take into account the role of temporal intelligence in language learning. Only one study has investigated

the role of temporal intelligence in language teaching so far (Naji Meidani, Pishghadam, Ghonsooly, & Hosseini Fatemi, 2018).

Language learners’ self-regulation and self-efficacy are two psychological variables brought into play in this study with regard to temporal intelligence. Just like temporal intelligence, self-regulation and self-efficacy are related to metacognition. Self-regulation refers to how a learner manages his/her learning in order to achieve the desired attainments. The two specific types of self-regulation that are taken into consideration here are autonomous and controlled. Autonomous self-regulation involves management of learning with volition and inner willingness, while controlled self-regulation signifies an imposed or outer reason for management of learning (Deci & Ryan, 2009). Self-efficacy, which is related to self-regulation, refers to how much a learner feels he or she is capable of carrying out a given task (Bandura, 1982). When individuals feel confident in their capabilities to learn and perform a given task, they reduce negative thinking and worrying over potentially threatening settings and tasks. Thus, self-efficacy in learning English shows learners’ confidence in achieving success.

As claimed by Bandura (1994), self-efficacy beliefs affect the kind of activities and environments that people choose to engage with. They avoid activities and circumstances they believe exceed their coping abilities and select challenging activities and situations which they judge themselves capable of handling. Finding out the role of temporal intelligence in language learners’ self-efficacy in learning English would highlight the extent to which they believe they are capable of being able to succeed with consideration of their temporal practices. Moreover, the effect of temporal intelligence on autonomous and controlled self-regulation would demonstrate how the subconstructs of temporal intelligence affect learners’ involvement in language learning with eagerness and willingness, or in response to environmental demands. By and large, it seems that temporal intelligence, as a metacognitive variable, can have an effect on learners’ self-regulation and self-efficacy.

Temporal Intelligence

In 1999, Francis-Smythe and Robertson (1999) raised the notion of “Time Personality”, which concerns individual differences related to time. The scale they had designed comprised of five factors, i.e., leisure time awareness, punctuality, planning, polychronicity and impatience. They discussed their findings in the context of the role time personality might play in moderating the effects that differing organizational structures and changing work demands might have in organizational settings. In 2005, Clemens and Darlyrmp brought up the notion of “Temporal Intelligence” for the first time to highlight the importance of time-related aspects in leadership. In 2008, Doyle and Francis-Smythe perceived of temporal intelligence as consisting of both time personality (self-referenced) and follower-referenced temporal practices. They proposed that there are 13 dimensions of time with

Table 1. Time-related Individual Differences Identified in the Literature (Adapted from Francis-Smythe & Robertson, 1999)

Dimension	Brief Definition
Time orientation	Preference for focusing on the past, the present or the future
Time span	Capacity to carry out tasks with varying time spans
Scheduling	Extent to which one sticks to schedules and meets deadlines
Punctuality	Extent to which one is punctual and can tolerate unpunctuality in others
Time boundaries	Extent to which one has clear boundaries between work and leisure
Synchronization	Extent to which one can organize completion of one task alongside and in unison with others
Coordination	Extent to which one can organize the completion of one task in sequence with one or more others
Time buffers	Extent to which one plans free slots into the day to allow for unpredicted events or to allow scheduled events to take longer
Pace	External pace set by the task demands
Time urgency	Internal pace imposed by the individual
Speed vs. accuracy	Extent to which accuracy is compromised to attain speed
Polychronicity	Combination of activities simultaneously
Awareness of time use	Experience of time-in-passing
Awareness of clock time	Awareness of actual clock time
Autonomy	Perception of control over time

regard to follower-referenced temporal practices, including deadlines, decisive timing, pace, co-ordination, temporal perspective interaction, breaks, time buffers, time allocation, quality and speed, quality vs. speed, time boundaries between work and non-work, autonomy, and timelessness.

Based on these self-referenced and follower-references dimensions, Doyle and Francis-Smythe (2008) constructed a questionnaire to measure leaders' temporal intelligence. Doyle (2012) defined the structure of temporal intelligence as an individual difference factor. Furthermore, employing the definition of temporal intelligence for leaders, a scale was designed by Naji Meidani et al. (2018) to assess language teachers' temporal intelligence. The scale referred to self-referenced temporal practices of language teachers and their follower-referenced ones in relation to their students.

Various aspects about the concept of time have been included in different studies and research areas. In a review done by Francis-Smythe and Robertson (1999), a list of time-related individual differences with their definitions was provided (Table 1).

Although Francis-Smythe and Robertson's (1999) list gives us an informative overview on individual differences related to time, there are other concepts, components and dimensions found in the time literature, as well. The concept of "time perspective" has been promoted as part of a research programme launched by the Zimbardo group at Stanford. Zimbardo and Boyd (1999, p. 1271) consider time perspective to be "the often unconscious process whereby the continual flows of personal and social

experiences are assigned to temporal categories, or time frames, that help to give order, coherence, and meaning to those events". Essentially, time perspective is a measure of how the three time frames of past, present and future influence one's behaviour and how one adapts to changes. Preoccupation with a specific time frame, or the lack of attention for a time frame, shows inability in adaptation. "Time management" is another concept found in the time literature. It was introduced at the end of the 1950s as a method for effectively coping with time issues on the job (see Claessens, 2004). According to Lakein (1973, cited in Claessens, 2004), time management involves determining needs, setting goals to achieve the needs, prioritizing the tasks required and matching tasks to time and resources through planning, scheduling and making lists. Another factor found in the time literature is "time estimation", which refers to prospective and retrospective situations. In prospective situations, attention is directed at the passing of time, meaning that time is estimated by processing temporal information. In contrast, in retrospective situations, attention is directed at processing non-temporal information, and time estimation is therefore based on remembering the information processed during the estimation interval (Zakay, 1990).

Self-regulation

The notion of self-regulation has emerged in the literature of health psychology, educational psychology, and organizational psychology. As defined by Ellis (2008),

“self-regulation is the ability to monitor one’s learning and make changes to the strategies that one employs. It involves both the ability to exercise control over one’s attitudinal/motivational state and to engage in self-critical reflection of one’s actions and underlying belief systems” (p. 978). According to Zimmerman (1989), self-regulation is “self-generated thoughts, feelings, and actions used to attain goals.”

Self-regulated students who are motivationally, behaviorally, and metacognitively active in their own learning, probably achieve high levels (Risemberg & Zimmerman, 1992). In fact, researchers have suggested self-regulation to be an essential factor in students’ academic achievement (Boekaerts, Pintrich, & Zeidner, 2005; Morosanova, Fomina, & Bondarenko, 2015). Within the domain of language learning and especially in foreign language learning, self-regulation has gained increasing momentum in the last few decades (see Seker, 2015).

The main component behind self-regulation is the concept of motivation (Dornyei, 2005). In this respect there are two types of self-regulation: autonomous and controlled (Deci & Ryan, 2009). Autonomous self-regulation involves engaging in an activity with eagerness and volition, with a sense of choice and willingness. It is made up of two subtypes: (1) intrinsic motivation, which means doing a task because it is interesting and spontaneously satisfying; and (2) identified motivation, which is a well internalized form of extrinsic motivation and involves doing the task because it feels personally important. In contrast, controlled self-regulation involves doing a task with a sense of pressure, demand, or coercion. It comprises two subtypes of extrinsic motivation that have not been well internalized: (1) external motivation, which means doing the activity in order to receive a reward or avoid a punishment; and (2) introjected motivation, which results from partial internalization of the extrinsic contingencies and involves doing an activity because the person would feel approved of for doing it, or guilty and unworthy for not.

Self-efficacy

The concept of self-efficacy was first introduced by Bandura in 1977. Self-efficacy is defined as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). People with a higher degree of efficacy are more likely to put greater effort towards meeting their goal (Kirk, 2012). Moreover, they are more likely to be more persistent to complete the activity successfully when they have a previous and successful experience with a similar activity (Kirk, 2012). Bandura (1977) hypothesized that self-efficacy affects an individual’s choice of activities, effort, and persistence. Interestingly, self-efficacy beliefs do not necessarily reflect an individual’s motivation to pursue a particular goal. Self-efficacy beliefs are defined as people’s perceptions of their capability to execute the actions necessary to achieve a desired goal. Therefore, self-efficacy is not a perception of whether one will perform these actions or whether one will necessarily achieve the desired outcomes, but an evaluation of whether

one can actually perform the necessary actions (Bandura, 1997). That is why Bandura (1982) suggested the use of “can” instead of “will” or “confident” to indicate a person’s self-efficacy.

Within the context of education, numerous studies have been conducted to prove the power of this construct on academic performance. Within the domain of language studies, there has been a growing body of empirical research on the impact of self-efficacy on learning a new language. For example, Magogwe and Oliver (2007) found that there is a dynamic relationship between language learning strategies, proficiency, and self-efficacy beliefs. Similarly, Diseth (2011) noted that an increase in self-efficacy beliefs was associated with an increase in the use of language learning strategies and an increase in the English proficiency of language learners. Liem, Lau, and Nie (2008) revealed that self-efficacy had direct positive effects on the performance-approach goal but negative effects on the performance avoidance goal. Overall, studies have maintained that enhancing English language learners’ self-efficacy beliefs is crucial to their language learning process

Purpose of the study

Although temporal intelligence has been originally defined for leaders, it can be extended to all groups of individuals. In light of the theoretical background presented above, no instrument has been designed to assess temporal intelligence in general. Moreover, the lack of research on language learners’ temporal intelligence and its possible effect on related variables shows a clear need to undertake such studies. Thus, the present research focuses on developing a general temporal intelligence scale and investigates language learners’ temporal intelligence and its relationship with learner self-regulation and learner self-efficacy. Thus the study addresses specifically the following questions:

1. Does the newly-designed General Temporal Intelligence Scale (GTI-S) demonstrate psychometric properties (reliability and validity)?
2. Does EFL learners’ temporal intelligence significantly affect their autonomous and controlled self-regulation, and self-efficacy?
3. Do the factors of the General Temporal Intelligence Scale (GTI-S) significantly predict EFL learners’ autonomous and controlled self-regulation, and self-efficacy?

Methodology

Participants and Setting

The participants included a total of 520 EFL learners (66.9% female, 33.1% male), learning English at various private language institutes in Mashhad, city in northeastern Iran. They were selected based on convenience sampling. The reason English learners of language institutes were chosen was because they were occupied with their own profession or education in a field other than English at

the same time that they were attending the institutes. Therefore, their temporal intelligence was an important component in how they spent and organized their time. The distribution of their level of English proficiency was the following: 21.3% elementary, 20.9% intermediate, 28% intermediate, 14.4% upper intermediate, 14.4% advanced and 1% missing, based on the level of the class they had registered in. Their age ranged from 18 to 57 years (mean = 28).

Instrumentation

General Temporal Intelligence Scale (GTI-S)

The GTI-S was constructed based on Doyle and Francis-Smythe's (2008) subconstructs of temporal intelligence, Francis-Smythe and Robertson's (1999) notion of time personality, Zimbardo's Time Perspective Inventory (ZTPI) designed by Zimbardo and Boyd (1999), the "Time Styles" scale by Usunier and Valette-Florence (1994) and the existing subconstructs of time-related individual differences in the literature (Francis-Smythe & Robertson, 1999). Thereby, an eight-factor model was proposed with the following subconstructs: Temporal Persistence (being able to continue doing an activity until its completion), Obedience to Time (being punctual and following what has been scheduled), Time Anxiety (sensitivity towards time), Linearity of Time (planning and scheduling), Balanced Temporal Perspective (learning from the past, living in the present, and planning for the future), Leisure Time Awareness (having a boundary between work and non-work affairs), Multitasking (being able to do many things at the same time) and Economicity of Time (using time in the best possible way).

A total of 35 items were written on a six-point Likert-type scale ranging from Always (6) to Never (1). Subsequently, 5 language learners were asked to respond to the scale and give comments about its content as they responded to it. A few items had to be restated to clear their ambiguities. The revised version of the scale was administered to the participants (see Appendix A for sample items). The scores of items 3, 4, 5, 17, 21, 23, 25, 26, 30, 31, 32, 34 and 35 have to be reversed.

Learning Self-regulation Questionnaire (SRQ-L)

The SRQ-L was developed by Black and Deci (2000) for college students studying organic chemistry. As stated by the designers, the questionnaire can be adapted as needed to refer to the particular course or program being studied. It asks three general questions about why people engage in learning-related behaviors. For each question, four items are provided (see Appendix B for sample items). This questionnaire was formed with two subscales: Controlled Regulation and Autonomous Regulation. Thus, the responses that are provided are either controlled (i.e., external or introjected regulation) or autonomous (identified regulation or intrinsic motivation). The total reliability of the scale in the current study, calculated by Cronbach's alpha was .82. The Autonomous and Controlled Regulation components had a reliability of .72 and .78, respectively.

English Self-efficacy Scale

In order to assess learners' English self-efficacy, the scale developed and validated by Rahemi (2007) was utilized. This scale consists of 10-item five point Likert scale ranging from 'strongly disagree' (1) to 'strongly agree' (5) (see Appendix C for sample items). This instrument had been developed using Beliefs about Language Learning Inventory (BALLI) (Horwitz, 1988), and the General Self-efficacy Scale developed by Nezami, Shwarzer, and Jerusalem (1996). The total reliability of the scale in the current study, estimated via Cronbach's alpha was .76.

Data Collection

After gaining permission from the private language institutes and their teachers, the researcher distributed the questionnaires in the classrooms. Overall, it took about 15 minutes to complete the three instruments. Prior to the administration of the questionnaires, all participants were informed that their responses would remain anonymous and their participation was not mandatory.

Data Analysis

After an eight-factor model was proposed for the GTI-S, the data were entered into Linear Structural Relations (LISREL) 8.5 in order to conduct CFA. Subsequently, Statistical Package for Social Sciences (SPSS) was used to analyze the data. Pearson product-moment correlations were run to find out if there are any significant relationships between temporal intelligence and self-regulation (autonomous and controlled) and self-efficacy. Next, to find out which of the factors of the GTI-S can significantly predict each of the aforementioned variables, multiple regressions were conducted.

Results

Validation of the GTI-S

In order to validate the GTI-S, CFA was utilized. As explained in the Data Analysis section, eight factors were proposed for temporal intelligence based on the review of the literature. In order to assess fit of the model, CFA utilizes many statistical tests. To confirm the fitness of the model, first of all t-value must be significant, meaning that at 95% level of confidence, it should be higher than 1.96 or lower than -1.96 ($t\text{-value} > 1.96$ or $t\text{-value} < -1.96$), and secondly, its goodness-of-fit indices must be appropriate. The goodness-of-fit indices used in this study are the following: Relative Chi-square, which is obtained from dividing chi-square on degrees of freedom (χ^2/df), with an acceptable range of 1 to 3, Root Mean Squared Error of Approximation (RMSEA), with an acceptable amount of below 0.08, Adjusted Goodness of Fit Index (AGFI), Goodness - for- Fit Index (GFI), Incremental Fit Index (IFI), Comparative Fit Index (CFI), Normal Fit Index (NFI), all with an acceptable amount of above 0.9 (Hu & Bentler, 1999).

The summary of the results of the CFA is presented in the table below. As can be seen, the t-value of items 17

and 21 are not in the acceptable range. Therefore, these two items must be omitted and another CFA is conducted without these two items.

The results of the second CFA (without items 17 and 21) are presented in the figures 1 and 2.

Table 2. Results of the First CFA

Variables	Items	Path Coefficients	t-value
Temporal Persistence	TI1	0.69	14.80
	TI11	0.62	12.64
	TI18	0.64	12.98
	TI35	0.60	10.75
	TI2	0.99	21.11
Obedience to Time	TI3	0.74	9.64
	TI5	0.84	16.12
	TI16	0.97	15.12
	TI19	0.57	13.38
	TI23	0.95	16.55
Time Anxiety	TI20	0.18	3.70
	TI27	-0.34	-5.40
	TI30	-0.60	-8.26
Linearity of Time	TI33	-0.25	-5.03
	TI12	1.11	23.72
	TI32	0.58	10.71
Balanced Temporal Perspective	TI4	0.53	8.27
	TI9	0.72	12.43
	TI13	1.01	5.31
	TI22	0.75	16.56
Leisure Time Awareness	TI24	-0.16	-2.15
	TI6	0.16	2.69
	TI17	0.001	-0.07
Multitasking	TI28	-0.690	-12.49
	TI34	0.81	14.33
	TI10	0.99	15.18
	TI21	0.002	0.071
Economicity of Time	TI29	1.16	18.95
	TI31	0.23	3.80
	TI7	0.63	11.56
	TI14	0.45	9.06
	TI15	0.75	15.16
	TI25	0.66	14.18

Figure 1. Path Coefficients of the Second CFA

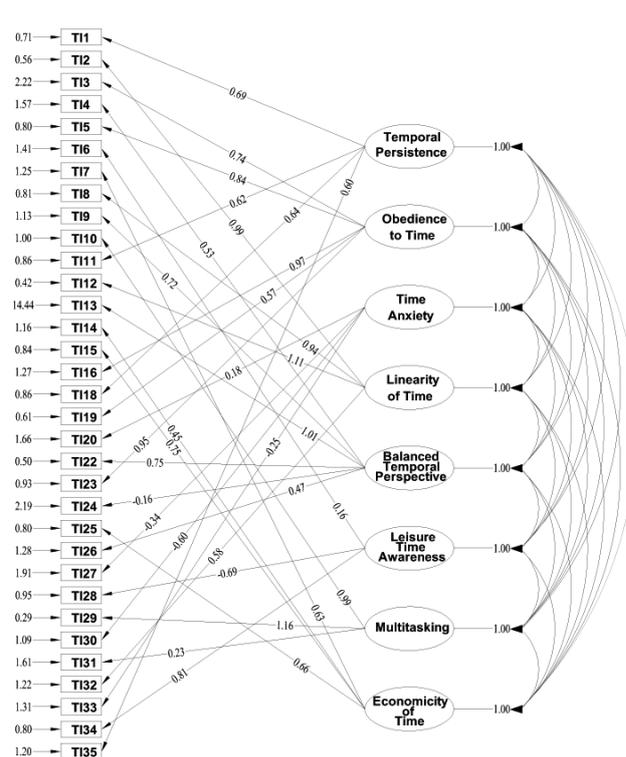
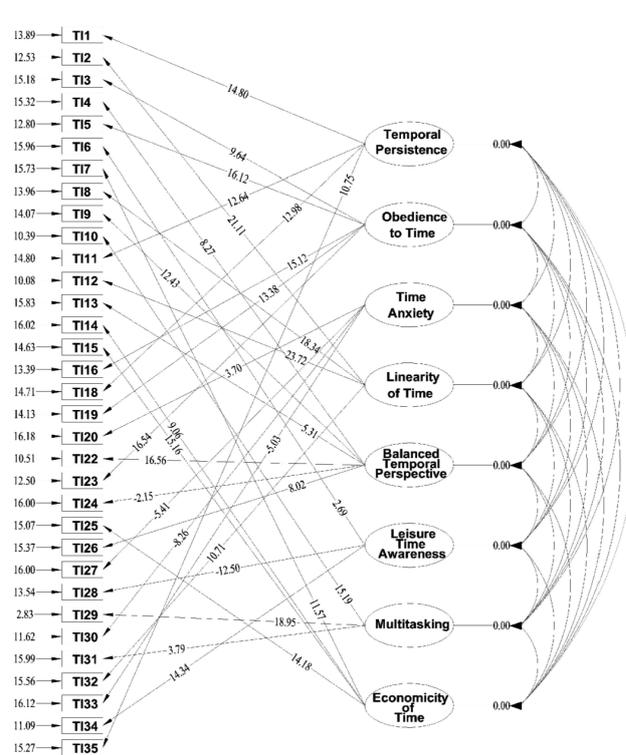


Figure 2. T-values of the Second CFA



The summary of the results demonstrated in the above figures is given in Table 3. As can be seen, all t-values are either higher than 1.96 or lower than -1.96. Therefore, we can conclude that all items (except items 17 and 21) of the GTI-S provide an appropriate factor structure for measuring temporal intelligence.

Table 3. Results of the Second CFA

Variables	Items	Path Coefficients	t-value
Temporal Persistence	TI1	0.69	14.80
	TI11	0.62	12.64
	TI18	0.64	12.98
	TI35	0.60	10.75
Obedience to Time	TI3	0.74	9.64
	TI5	0.84	16.12
	TI16	0.97	15.12
Time Anxiety	TI19	0.57	13.38
	TI23	0.95	16.54
	TI20	0.18	3.70
	TI27	-0.34	-5.41
Linearity of Time	TI30	-0.60	-8.26
	TI33	-0.25	-5.03
	TI2	0.99	21.11
Balanced Temporal Perspective	TI8	0.94	18.34
	TI12	1.11	23.72
	TI32	0.58	10.71
	TI4	0.53	8.27
Leisure Time Awareness	TI9	0.72	12.43
	TI13	1.01	5.31
	TI22	0.75	16.56
	TI24	-0.16	-2.15
Multitasking	TI26	0.47	8.02
	TI6	0.16	2.69
	TI28	-0.69	-12.50
Economicity of Time	TI34	0.81	14.34
	TI10	0.99	15.19
	TI29	1.16	18.95
	TI31	0.23	3.79
	TI7	0.63	11.57
	TI14	0.45	9.06
	TI15	0.75	15.16
	TI25	0.66	14.18

The Goodness-of-fit indices can be seen in the Table 4.

As the results indicate, RMSEA equals 0.076, which is lower than 0.08 and thus it shows that the model is acceptable. Also, relative chi-square, i.e., chi-square divided by degrees of freedom χ^2/df , is 2.81, which is between 1 and 3; and therefore it is appropriate. The other indices, i.e., NFI, GFI, IFI and CFI are all higher than 0.9. Therefore, all the indices are acceptable and the CFA confirms the eight factors of the GTI-S.

Table 4. Goodness-of-fit Indices for the GTI-S

CFI	IFI	GFI	NFI	RMSEA	χ^2/DF
0.94	0.93	0.91	0.92	0.076	2.81

Reliability of the GTI-S

The reliability of each scale and their subscales are presented in Table 5. As the table shows, all scales and subscales have Cronbach's alphas above the recommended value of .70 (Pallant, 2007).

Table 5. Reliability of the Scales and their Subscales

Variables	Cronbach's Alpha	N of Items
Temporal Persistence	0.730	4
Obedience to Time	0.724	5
Time Anxiety	0.769	4
Linearity of Time	0.801	4
Balanced Temporal Perspective	0.733	6
Leisure Time Awareness	0.789	3
Multitasking	0.783	3
Economicity of Time	0.712	4
Temporal Intelligence	0.819	33
Autonomous Self-regulation	0.762	6
Controlled Self-regulation	0.760	6
self-regulation	0.746	12
Self-efficacy	0.821	10

Correlations and Multiple Regression Analyses

In order to find out the relationship between temporal intelligence and each of the dependent variables, i.e. autonomous self-regulation, controlled self-regulation, and self-efficacy, person product-moment correlation coefficient was used.

Table 6. Correlations between Temporal Intelligence and the Dependent Variables

	Temporal intelligence
Autonomous self-regulation	.589 *
Controlled self-regulation	.595 *
Self-efficacy	.623 *

* $P < .05$

As can be seen in the table, significantly positive relationships were found between temporal intelligence and each of the dependent variables ($p < .05$). In other words, there was a significantly positive correlation between temporal intelligence and autonomous self-regulation,

$r = .589$, temporal intelligence and controlled self-regulation, $r = .595$ as well as temporal intelligence and self-efficacy, $r = .623$. According to Cohen (1988), the strength of the relationship for correlation coefficients higher than .50 is large. Thus, there was a significantly strong positive relationship between temporal intelligence and each of the dependent variables under study. To find out the predictability of the eight factors of the GTI-S, multiple regressions were used.

Prediction of Autonomous Self-regulation by the Factors of the GTI-S

As evident in Table 7, the model is significant ($F = 5.404$, model sig = .000, $p < .05$) with Temporal Persistence, Linearity of Time, and Multitasking as the significant predictors. It also shows that the Adjusted R^2 equals .064, indicating that in this regression model about 6% of the variance can be predicted from the independent variables. That is to say, the scores of Temporal Persistence, Linearity of Time, and Multitasking account for nearly 6% of the variance in autonomous self-regulation.

Regarding Standardized Beta coefficients, the relationships between the significant predictors and autonomous self-regulation is positive. Linearity of Time with the highest beta coefficient can best predict autonomous self-regulation ($B = .348$, $p < .05$). Following that, Temporal Persistence and Multitasking with standardized Beta coefficients of .243 and .124 significantly predict autonomous self-regulation ($p < .05$). It is, accordingly, implied that EFL learners with higher Temporal Persistence, Multitasking, and especially Linearity of

Time are more likely to have higher autonomous self-regulation.

Prediction of Controlled Self-regulation by the Factors of the GTI-S

Table 8 demonstrates a significant model ($F = 4.012$, model sig = .000, $p < .05$) with two predictors. It also indicates that controlled self-regulation has a significant and positive correlation with Multitasking ($B = .115$, $p < .05$) and Economicity of Time ($B = .232$, $p < .05$), the latter being a stronger predictor of controlled self-regulation.

As evident in the above table, the Adjusted R^2 of the model is .045, which means that nearly 5% of the variance in controlled self-regulation can be predicted from Multitasking and Economicity of Time. Altogether, this regression model implies that EFL learners who do multitasking and care about saving time are probably expected to have higher controlled self-regulation.

Prediction of Self-efficacy by the Factors of the GTI-S

Based on the Table 9, a significant model ($F = 14.381$, model sig = .000, $p < .05$) was found holding Obedience to Time, Linearity of Time, Balanced Temporal Perspective, and Multitasking as the predictors. The Adjusted R^2 for the model equals .172, which means that these four dimensions of time can account for about 17% of the variance in self-efficacy.

Based on Standardized Beta coefficients, Obedience to Time ($B = .171$, $p < .05$), Linearity of Time ($B = .198$, $p < .05$), Balanced Temporal Perspective ($B = .191$, $p < .05$), and Multitasking ($B = .138$, $p < .05$) have a significant and positive relationship with self-efficacy.

Table 7. Multiple Regression Analysis for Predicting Autonomous Self-regulation

Model	Unstandardized Coefficient		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
Constant	5.077	.597	–		8.506	.000	–	–
Temporal Persistence	.371	.115	.243		3.224	.001	.318	3.149
Obedience to Time	.123	.068	.093		1.813	.070	.684	1.463
Time Anxiety	–.052	.101	–.026		–.516	.606	.711	1.407
Linearity of Time	.430	.091	.348		4.751	.000	.337	2.968
Balanced Temporal Perspective	–.020	.063	–.015		–.311	.756	.756	1.323
Leisure Time Awareness	–.054	.089	–.028		–.614	.540	.899	1.112
Multitasking	.159	.061	.124		2.579	.010	.778	1.285
Economicity of Time	.144	.102	.093		1.415	.158	.417	2.397
R		R Square	Adjusted R Square	Durbin-Watson	Kolmogorov-Smirnov Sig	F	Model Sig.	
.280		.078	.064	1.911	.751	5.404	.000	

Table 8. Multiple Regression Analysis for Predicting Controlled Self-regulation

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
Constant	4.274	.370			11.565	.000		
Temporal Persistence	-.009	.071	-.009		-.124	.902	.318	3.149
Obedience to Time	-.052	.042	-.064		-1.236	.217	.684	1.463
Time Anxiety	.088	.063	.072		1.405	.161	.711	1.407
Linearity of Time	-.105	.056	-.139		-1.873	.062	.337	2.968
Balanced Temporal Perspective	.013	.039	.016		.330	.741	.756	1.323
Leisure Time Awareness	.017	.055	.014		.315	.753	.899	1.112
Multitasking	.090	.038	.115		2.362	.019	.778	1.285
Economicity of Time	.220	.063	.232		3.481	.001	.417	2.397
R		R Square	Adjusted R Square	Durbin-Watson	Kolmogorov-Smirnov. Sig	F	Model Sig.	
.244		.059	.045	1.889	.259	4.012	.000	

Table 9. Multiple Regression Analysis for Predicting Self-efficacy

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
Constant	2.608	.245			10.652	.000		
Temporal Persistence	.080	.047	.121		1.704	.089	.318	3.149
Obedience to Time	.098	.028	.171		3.540	.000	.684	1.463
Time Anxiety	.038	.042	.043		.903	.367	.711	1.407
Linearity of Time	-.107	.037	.198		2.870	.004	.337	2.968
Balanced Temporal Perspective	.108	.026	.191		4.148	.000	.756	1.323
Leisure Time Awareness	-.044	.036	-.052		-1.221	.223	.899	1.112
Multitasking	.077	.025	.138		3.047	.002	.778	1.285
Economicity of Time	.064	.042	.094		1.521	.129	.417	2.397
R		R Square	Adjusted R Square	Durbin-Watson	Kolmogorov-Smirnov. Sig	F	Model Sig.	
.429		.184	.172	1.917	.214	14.381	.000	

Also, Linearity of Time turned out to be the strongest predictor for self-efficacy. It follows that the more EFL learners are sensitive towards the passing of time, the more they have a linear view towards time, the more they can balance their perspective towards the past, present, and future, and the more ability they have in doing many tasks at the same time, the higher self-efficacy they may have.

Discussion

This study is the first endeavor in the literature that has examined the role of temporal intelligence in language learning. In this study, first a scale was designed based on the review of the literature to evaluate general temporal intelligence. Thereby, an eight-factor model

consisting of 35 items was proposed. Subsequently, CFA was run, which resulted in two items being removed from the model, thus turning the GTI-S into 33 items in total. As for the reliability of the GTI-S, Cronbach's Alphas were calculated, which showed high reliability of the scale and its subscales. Moreover, the results of Pearson product-moment correlation revealed that temporal intelligence has a significantly positive relationship with learners' autonomous self-regulation, controlled self-regulation, and self-efficacy.

In order to see which of the eight confirmed factors of the GTI-S significantly predict autonomous self-regulation, controlled self-regulation and self-efficacy, multiple regressions were run. The results showed that Temporal Persistence, Linearity of Time and Multitasking can significantly predict autonomous self-regulation. Among these factors, Linearity of Time is the best predictor of autonomous self-regulation. Multitasking and Economicity of Time are the significant predictors of controlled self-regulation, with Econominess of Time being the better of the two. Finally, Obedience to Time, Linearity of Time, Balanced Temporal Perspective and Multitasking can significantly predict self-efficacy, with Linearity of Time as the best predictor. Yet, the roles of each of the factors in the magnitude of each of the dependent variables should not be overemphasized. Given that all the significant predictors of general temporal intelligence can account for nearly 6% of autonomous self-regulation, 5% of controlled self-regulation, and 17% of self-efficacy, the role of each factor is not very large. The findings seem plausible given that there are a wide range of potential variables which can shape or give rise to autonomous and controlled self-regulation and self-efficacy.

Based on the findings, we can say that among the factors of the GTI-S, Linearity of Time (as the best predictor of both autonomous self-regulation and self-efficacy), Economicity of Time (as the best predictor of controlled self-regulation) and Multitasking (as the common predictor of all the three dependent variables) are the most important subconstructs of time. The linear view towards time is what is prevalent in English-speakers' culture, and has turned time into a valuable asset for them (McGrath & Tschan, 2004). Therefore, it seems reasonable that Linearity of Time has been found as the most important predictor of two of the variables in this study. A linear view towards time implies scheduling for activities, having short-term and long-term plans, and overall believing that time progresses and moves. We may plausibly argue that this view drives the language learner to manage his/her learning out of volition and willingness, and to have the belief that he/she is capable of overcoming the obstacles in the process, obtaining satisfactory results, and reaching the pinnacle of success in learning English. Basically, the linear view towards time gives an individual a better sense of purpose, and an inner urge to achieve that purpose, knowing that time will eventually run out. In controlled self-regulation, there is an outer force or compel to learn English. Economicity of Time, which signifies saving time as much as possible, best predicts controlled self-regulation. Based on the results, it appears that there

is a relationship between having an economical view towards time and being under pressure to do something. Considering that nowadays individuals are usually busy with many affairs at the same time, it is conceivable that Multitasking has been found as the common predictor of all three dependent variables. It is reasonable that being able to accomplish many tasks concurrently, without becoming anxious or losing control, can lead to many great outcomes. Multitasking is especially important for EFL learners who attend language institutes, for the reason that they pursue learning English alongside many other goals and endeavors.

The results of this study should be interpreted in light of some limitations. First of all, the measures were obtained from self-reported questionnaires, which considering the practical nature of temporal practices, they may not be completely reflective of the participants' real-life actions. Also, as with all questionnaire-based studies, there is a possibility that not all questions were answered with due care; or the participants had never paid close attention to their temporal practices. Furthermore, the subconstructs included for general temporal intelligence may not be inclusive enough, and other subconstructs may also exist. Also, as not everyone supports the idea of multiple intelligences, perhaps not everyone may agree with what has been measured as temporal intelligence. Finally, with respect to generalizability of the results of this study, it was done among a sample of Iranian EFL learners. Therefore, generalizing the findings to other contexts should be done cautiously.

In spite of these limitations, there are noteworthy implications based on the findings of this study. The newly-designed scale can be used for all groups and all contexts to assess their temporal intelligence. Each of its eight factors can be used separately to assess their relationship with other variables. Thus, the scale can be a significant instrument for doing research. In addition, it can be used as a pedagogical tool for training individuals to work on their temporal intelligence. As the findings have revealed the significant effect of language learners' temporal intelligence on their self-regulation and self-efficacy, special programs can be designed to teach language learners and even learners of other fields about the importance of time and familiarize them with different time subconstructs. More particularly, making learners aware of the benefits of temporal intelligence can be rewarding for both themselves and their teachers. In this regard, students should be trained in how to deal with many tasks at the same time, to make plans, to follow their schedule regularly, to keep on going with their plan, to save time and to give themselves some free time. Considering that a linear view towards time has a significant effect on language learners' self-efficacy and autonomous self-regulation, this concept should become internalized in both teachers' and students' minds.

Overall, temporal intelligence is an uncharted area that awaits further research. Further improvement and evaluation of the GTI-S with broader sample populations is required. Investigating the relationship between each of the factors of the GTI-S and other variables and examining

the relationship between temporal intelligence and the four language skills are some of the areas suggested for future research.

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Appendices

Appendix A

Sample items of the GTI-S

Once I start a task, I continue it until I complete it.

I prioritize my activities.

I live in the past.

Appendix B

Sample items of the SRQ-L

A. I will participate actively in English class:

Because I feel like it's a good way to improve my understanding of the material.

B. I am likely to follow my instructor's suggestions for studying English:

Because I would get a bad grade if I didn't do what he/she suggests.

C. The reason that I will work to expand my knowledge of English is:

Because I want others to see that I am intelligent.

Appendix C

Sample items of the English Self-efficacy Scale

1. I have got a special ability for learning English.

2. I believe I have the power to get my desired grade in English final exam.

3. I think that someday I will speak English very well.