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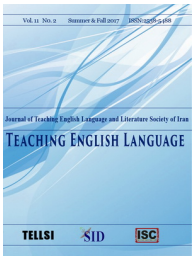

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Research Paper

Development, Validation and Application of an Inventory on Emo-Sensory Intelligence

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Abstract
Following the vociferous arguments with regard to the nature and assessment of intelligence, this article presented a framework for *emo-sensory intelligence*, as the sensitivity to the emotions evoked by sensory inputs. The ability to recognize sense-induced emotions, their appraisal, and regulation is supposed to modify one's behaviors and is assumed to be a necessary concomitant of a successful life. Recruiting a total of 1500 participants, a 144-item scale for measuring emo-sensory intelligence was developed and validated through structural equation modelling, multitrait-multimethod design along with the Rasch measurement model. The results yielded six models for the senses comprising the scale measuring recognition, labeling, monitoring, and management. The results of the repeated measures analysis indicated that participants' emo-sensory quotient was high for the sense of touch and low for the sense of movement. It was revealed that participants' emo-sensory quotient to recognize sense-induced emotions was higher than their emo-sensory quotient for other components. The results of multiple regression analysis indicated that participants' emo-sensory quotient for the senses of hearing, sight, and movement could account for 49%, 44%, and

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19% percent of changes in their Grade Point Average, respectively. In the end, the role of emo-sensory intelligence as a leading factor in daily life was discussed and further avenues for research were suggested in the fields of psychology and education.

Keywords: Emo-Sensory Intelligence, Emotional Intelligence, Sensory Intelligence, Sense, Emotion

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1. Introduction

Intelligence has been a serious bone of contention since time immemorial. In his Republic, when Plato (trans. 1963) classified men into gold (cognition), silver (emotion), and bronze (sense), he could barely imagine this would be a source of inspiration for future generations. In Western tradition, cognition has long been given primacy over emotion and sense. Emotions were considered to result in reduction of thinking abilities, and body senses were held to delude logical reasoning (Schaffer, Gilmer, & Schoen, 1940). It was not up until the end of the 20th century when emotional (Bar-On, 1988; Goleman, 1995; Salovey & Mayer, 1990) and embodied (Lakoff & Johnson, 1980) movements shook the hegemony of cognitive paradigm in psychology. By digging into the history of intelligence, one can follow the same shift of focus, commencing with the works on psychometric intelligence (Binet & Simon, 1905a, 1905b; Galton, 1879) to *emotional intelligence* (EI) (Bar-On, 1988; Goleman, 1995) and *sensory intelligence* (SI) (Lombard, 2007). Psychometric intelligence primarily dealt with the cognitive abilities that could account for success in education (Binet & Simon, 1905a, 1905b), indicating that individuals with a high level of *intelligence quotient* (IQ) could presumably outperform in classroom. Contrary to those who hold this view that IQ is more important in success in life and education, Goleman (1995) argued that *emotional quotient* (EQ), holding to affect cognitive faculties and guide one's behaviors, outvalues IQ and plays a more significant

role. Beyond that and in line with embodied movements, Lombard (2007) maintained that *sensory quotient* (SQ), defined as the awareness of primitive sensory wiring of our brain, dominates IQ and EQ. To make a reconciliation between SQ and EQ, in this study, sensory emotions are highlighted and the concept of *emo-sensory intelligence* (ESI) as a leading factor in daily life is introduced. This study adapts a combinatory approach to define intelligence, and assumes that considering intelligence in separation (s factor) or in general (g factor) (Spearman, 1923, 1927) misses the point that diverse combinations of intelligence can give a better picture of reality. While SI mainly focuses on senses and EI is built upon emotions, the proposed ESI highlights a close bond between senses and emotions and juxtaposes the two concepts to shed some light on a so-far-hidden aspect of intelligence. ESI, as the sensitivity to emotions evoked by sensory inputs, is in fact rooted in the literature of *emotioncy* (emotion + frequency), which deals with the sense-induced emotions (Pishghadam, 2015). It is our belief that various emotions are generated when individuals use their senses to experience the world. That is, individuals with a high level of *emo-sensory quotient* (ESQ) are good at recognizing the sense-induced emotions and modifying their behaviors accordingly. In order to gauge this intellectual ability, a scale was developed and its robust psychometric properties were substantiated. Followed by that, Iranians' level of ESQ along with the major components of the scale were determined. To improve the generalizability of the scale, its predictive validity utilizing the students' Grade Point Average (GPA) as the predictor of the ESQ sub-constructs were assessed.

In the following, the history of intelligence as well as significance of senses, emotions, and particularly, sensory emotions are reviewed. In subsequence, the new idea of ESQ is proposed and its components are

delineated by introducing a scale through which individuals' ESI would be decided upon.

2. Theoretical Frameworks

2.1 From IQ to SQ

Over the last century, intelligence, as an elusive concept in psychology, has sparked heated debates, and there is little unanimity upon its definition (Sternberg, 2000). In general, intelligence refers to one's mental capacity with a heightened emphasis on reasoning, problem solving, and abstract thinking. Comments on intelligence can be traced back to ancient Greece where heroes were applauded for having greater power of thought (Carson, 2015). Scientific study of the concept, however, came into existence no sooner than the nineteenth century when Galton (1869, 1879) opined that superior characteristics in human beings are due to innate and inheritable mental capacities. Before long, Binet and Simon (1905a, 1905b) devised the first measure of intelligence to distinguish mentally retarded children at school. Binet's work was followed under the name of *Stanford-Binet* test revisited by Terman (1916), who coined the term intelligence quotient (IQ), but was later challenged by the emergence of newer designs such as Wechsler's tests (1958, 1981, 1987).

Positing that intelligence should be multifaceted (Schmiedek & Li, 2015), some forerunners of the field felt the need to move beyond cognitive abilities and consider other abilities as well (Cherniss, 2004). Thorndike (1920), for instance, defined *social intelligence* as being able to understand and manage how to act wisely in interpersonal relationships, and stated that it is different from conventional cognitive abilities and measures should be devised to assess it in a different fashion. During the succeeding years, attempts were made to devise measures of social intelligence but to no avail. Wechsler (1943) recommended that affective and conative abilities also be taken into

account in general intelligence. Quite analogously, Gardner (1983) came up with the idea of *multiple intelligences* (MI) introducing interpersonal and intrapersonal intelligences as well as more cognitive-based intelligences. In the same vein, Sternberg (1985) introduced practical intelligence and stated that interpersonal, intrapersonal, and practical intelligences are necessary for successful adaptations in life.

In 1988, Bar-On coined the term EQ as a counterpart to IQ and defined it as a set of social and emotional abilities vital for wrestling with the demands of daily life. The construct of EI terminated the vociferous voices of dissent between reason and emotions (Matthews, Zeidner, & Roberts, 2002), received widespread attention since its very inception, and became a topic of wide resonance (Matthews et al., 2002). Its popularity is very much indebted to Daniel Goleman's (1995) *emotional intelligence* that brought the idea to the masses. By promising a utopian classless society which is not confined to gene boundaries, EI cemented its place in history as a better predictor of human faculty (Matthews et al., 2002). EI, as one of the most reputable psychological constructs, has played a significant role in language studies (e.g., Pashazadeh & Alavinia, 2019; Roohani, Etesami, & Mirzaei, 2020), and blazed the path for other theories of intelligence to come into scene.

Lombard (2007) laid out the ability to crack individual sensory codes and preferences referred to as SQ, as an extension to the concept of intelligence. We experience the world through our senses. "We are all sensory beings" with unique experiences upon which words create images in our minds (Dunn, 2008, p. 15). The memories we have in our minds are all rooted in our sensory experiences, making us lead an idiosyncratic way of life which is quite likely to be influenced by the environment.

Although individuals might not notice, senses do affect our lives. Optimal arousal is needed for optimum performance. Yet, the amount of sensory

stimulation for an optimum performance differs for different individuals. Normal arousal is the "just-right state" to go through daily life (Lombard, 2007, p. 115). Knowing the right amount could change a challenging day to an enjoyable one. Based on the personal threshold system, individuals are categorized into sensation seekers (those with high sensory thresholds who tend to be more actively engaged with their environment) and sensation avoiders (those with low sensory thresholds who try to avoid sensations in the environment). High or low sensory threshold is subject to multiple factors including our genes, the way we were brought up, the language we speak, and the culture we inhibit which characterize the basis of our sensory profiles. Overall, it is believed that sensory evaluation and sensory suitability are the keys to optimizing human capital (Lombard, 2007).

2.2 From Senses to Emotions

The burgeoning contemplations on the role of sensorium initiated, perhaps, when Greek philosophers (except for Empedocles), indulging in their sensuous lives, drew sharp distinctions between sense and reason, and read senses through lenses of disdain as sources of mere hedonism could never be trusted (Guthrie, 1962). The dubiosity over sense and mind lived on in the thought trajectories of Socrates (Plato, trans. 1963), Descartes (trans. 1968), and even Plato (trans. 1963). Giving weight to senses, Aristotle's (trans. 1984) hierarchical order of senses was in proverbial fashion for centuries. The ambivalent view with regard to the sensorium stretched along to post-renaissance when views toward senses became more scientific and more epistemological. With the flurry of works in the 19th century (e.g., Largey & Watson, 1972) the panorama shifted toward restoring the significance of senses and their undeniable role in shaping human understanding. Perhaps Feuerbach's (trans. 1967) motto *I feel, therefore I am* turned into the staple of the current stream of thought on sensorium. However, despite years of

conjecturing over the origin, nature, and even number of senses, little unanimity exists (Synnott, 2002). Notwithstanding, the existing puzzles on sensoria, no one can deny the fact that human bodies are regularly immersed in a pool of sensations and our senses are antennae through which we are connected to the world. Furthermore, it is a matter of unanimous consensus that sensory channels, highly integrated and intermingled as they are, lead the flow of stimuli to the respective parts of the brain, and help us to build representations of the external world (Rouby, Fournel, & Bensafi, 2016). Furthermore, new advances in neuroscience have shifted our attention to the way emotional and cognitive processes interact with senses, that is, to the crucial role of sensory functions for emotional equilibrium (Rouby et al., 2016).

Yet, investigation into the evolution of emotions can be traced back to the 19th century. Debates over the nature of emotions initiated, perhaps, when Darwin (1872), with his groundbreaking work, *The Expression of the Emotions in Man and Animals*, broached the idea of basic emotions as those that remain unchanged across species. He viewed emotions as discrete entities (e.g., sadness, anger, fear) triggering a set of biological responses in the body. Years later, contrary to what laypersons' perception of emotions was, as feelings or affection, emotion as a psychological construct was defined through being broken up into components, namely physiological arousal, motor expression, subjective feeling, and motivation (Harris & Isaacowitz, 2001), and unabatedly influenced the body of literature on psychology (Cacioppo & Gardner, 1999).

One strand of research reflected over the sources of emotions, whether they were central (from senses to physiological reactions) or peripheral, namely from peripheral reactivity to central processing (e.g., Cannon, 1927). Such studies were enlarged upon through the works of Papez (1937) and

MacLean (1949), explaining the way emotional responses are controlled through context and experience. Accordingly, emotions, as necessary concomitants of cognitive processes (Contrada & Leventhal, 2007), were introduced as complex faculties which arise from the interaction between individual and environment. Thus, as a result of having varying degrees of encounter, there will be a fluctuation in frequency and valence of emotions each individual holds toward a particular demand. A never-ceasing obstacle has since been connecting this elusive quality of felt experience to physical reality (Harris & Isaacowitz, 2001).

In 2013, Pishghadam, Tabatabaeyan, and Navari embarked on a study undertaking the relationship between senses and emotions. They coined the term emotioncy (a blend of emotion and frequency) and defined it as the emotions provoked by sensory experiences which eventually relativize cognition. In espousing their theory, they traced the roots of the concept to pioneering studies of embodied cognition research program, when the role of sensorimotor capacities, body, and environment in molding one's cognition were put under the spotlight (Lakoff & Johnson, 1980) and to the time Greenspan's (1992) *developmental individual-difference relationship-based* (DIR) model accentuated affective domains. Emotioncy is also in line with the tenets of *life course theory* (Bengtson & Allen, 1993) and *activity theory* (Vygotsky, 1978). Suggesting that emotions can often be byproducts of sensory experiences, Pishghadam, Adamson, and Shayesteh (2013) hold that what we hear, see, taste, touch, and smell trigger various emotional responses within us which form our perceptions of reality. This foregrounded the idea of *sensory relativity hypothesis*, as a complementary view to Piaget's (1954) cognitive and Vygotsky's (1978) social constructivism (Pishghadam, Jajarmi, & Shayesteh, 2016). Pishghadam (2015) took a step forward and divided individuals into various types according to the extent of sensory stimuli they

each receive. Individuals may not have the slightest clue of a concept/word as a result of receiving no sensory input (null emotioncy), they may have only heard about it (auditory emotioncy), they may have heard about and seen it (visual emotioncy), they may have heard about, seen it, and smelled/touched it (kinesthetic emotioncy), they may have directly undergone the experience themselves (inner emotioncy), or they may have gone through the experience and took it upon themselves to research into it in order for additional information to be attained (arch emotioncy). He further expounded on different kinds of emotioncies individuals may hold toward a certain concept/word/situation and categorized them under the rubrics of avolvement (null emotioncy), exvolvement (auditory, visual, and kinesthetic emotioncies), and involvement (inner and arch emotioncies). In addition, in the case of receiving no sensory stimuli, no emotions are generated (avolvement). Based on this model, auditory, visual, and kinesthetic emotioncies bring about lower levels of emotions and lead to exvolvement as individuals are engaged from outside while inner and arch emotioncies that are considered to constitute higher levels of emotions and engage, for instance, language learners from inside lead to involvement and cause better comprehension, learning, and retention of language entities (Pishghadam, 2015).

The promulgation of emotioncy metric (Pishghadam, 2016) inaugurated a panoply of studies investigating the role of the proposed notion into various domains including language education, cultural studies, and social psychology (e.g., Makiabadi, Pishghadam, Naji Meidani, & Khajavy, 2019; Nouri, Pishghadam, & Naji Meidani, 2020). By and large, the idea of emotioncy amalgamated fragmented concepts of sense, emotion and cognition, shaping them into a whole like pieces of a puzzle, and provided us with a knitted picture of concepts mentioned previously. Emotioncy thus

bridges felt experience and physical reality which, although it is in its infancy, calls for further investigations to come into the scene. Not the least of which is what follows namely ESQ which encompasses the ideas of EQ and SQ.

2.3 ESQ

Senses serve more functions than mere identifying the external world. What we sense triggers a kind of emotion which is the reminiscent of Thomson, Crocker, and Marketo's (2010) *conceptual association*. For instance, the word *mom* may be associated with love, joy, and hug. Our reactions to various things we hear, see, smell, taste, or touch are similarly different. A reflection of this outlook could be observed in a study done on color-emotion associations (Pishghadam & Shayesteh, 2017). Employing colors as evidence, Pishghadam and Shayesteh (2017) strived to evaluate the extent to which participants could recognize, label, and manage their emotional reactions to colors. Analyzing the variations in the participant's responses, they came up with a three-set-model of emo-sensory expression (encompassing sense, emotion, and language) which eventually gave way to a new definition of intelligence coined as emo-sensory intelligence (ESQ). Having its root in the fundamental assumptions of EQ and SQ, ESQ is in fact "the ability to recognize, label, monitor, and manage sense-induced emotions to guide one's behavior" (p. 24). This study is thus a further attempt to fortify the underlying empirical foundations of the new concept.

In previous sections, the history of different forms of intelligence and the emotioncy theory were reviewed. In the following section, the significance of the six traditionally recognized senses, emotions, and sensory emotions in particular, and the nexus between them are explored.

2.3.1 Auditory sense

Human beings are continuously exposed to different sounds, both in real and virtual worlds. Generally, sound is capable of causing different reactions in people whether it is the sound of rain, a crying baby, or a rough loud sound like a bomb explosion. When it comes to acoustics and sounds, there is always something about a well-crafted sound, like music, which can bring emotional experiences and reactions. One of the main reasons people listen to music is that it can evoke emotions in listeners (Juslin & Laukka, 2003).

In brief, according to Tajadura-Jiménez and Västfjäll (2008), affective and emotional reactions to sounds can be classified into a number of categories such as physical determinants, natural determinants, spatial determinants, and cross-modal determinants. Although physical determinants mainly refer to features such as tempo, valence, and rhythm, natural determinants mainly focus on natural sounds like bird song, human speech and voice, so on. On the other hand, spatial determinants examine the effect of sound rendering or spatial reproduction techniques such as computer games on affective and emotional responses. Finally, cross-modal determinants explore the combination and integration of multiple senses and how auditory sense is integrated by other sensory modalities to evoke emotions.

2.3.2 Visual sense

Our visual system has a complex relationship with emotions (Yoon & Wise, 2014); that is to say seeing things brings about different emotions and our visual cortex in the brain is activated to help us process emotions. Researchers have studied different methods through which specific emotions are induced by visual stimuli including films (Philippot, 1993) and images (Bradley & Lang, 2000). For instance, Schupp, Markus, Weike, and Hamm (2003) gave sixty pictures including erotic couples, babies, family scenes,

household objects, and pictures of violence to the participants who categorized them as pleasant, neutral, or unpleasant.

Colors also reflect emotional impressions and cognitive functions (Thomson et al., 2010). Research into color emotions has shown that certain colors bring about certain emotions (Pishghadam & Shayesteh, 2017). For instance, red is associated with excitement and anger, blue manifests cleanliness and peace, green is associated with quietness, and black represents depression and anxiety (Shape, 1974). Similarly, light is considered as having a significant impact on psychophysiological reactions and emotional responses perceivers have (Tomassoni, Galetta, & Treglia, 2015). Light can induce certain emotional states (Tomassoni et al., 2015) and activate cognitive skills (Flynn, 1977).

2.3.3 Gustatory sense

Sense of taste is ranked first among senses in terms of brand loyalty impact index (Lindstrom, 2010), and is mostly involved in food industry. As Steptoe, Pollard, and Wardle (1995) state, taste is the most important factor in a consumer's food choices. In other words, when one tastes a food and finds it delicious, he/she makes a positive impression/emotion of it and may decide to try it again in future. Desmet and Schifferstein (2008) tried to discover emotions experienced by individuals tasting or eating foods. Their findings showed that after tasting foods, the participants reported pleasant emotions like satisfaction, desire, and enjoyment more frequently in their self-reports while unpleasant emotions like anger, sadness, and jealousy were reported less.

Noel and Dando (2015) took the stance that increased sweetness brings about more positive emotions while decreased sweetness and elevated sourness lead to negative emotions. A sweet taste is regarded to be pleasant while tastes like sour and bitter are considered to be generally aversive

(Steiner, 1979). A bitter taste, associated with difficult and unpleasant situations, has a negative impact on one's general mood (Yang, Baad-Hansen, Wang, Xie, & Svensson, 2014) and may increase hostility (Sagioglou & Greitemeyer, 2014). On the other hand, a sweet taste might reduce stress and improve mood (Gibson, 2006), and develop interest in interpersonal relationships (Ren, Tan, Arriaga, & Chan, 2015).

2.3.4 Olfactory sense

The use of sense of smell in various contexts can be traced back to ancient Egypt. Scents had religious and symbolic meanings in ancient Egypt and are now still used in Buddhism and Hinduism and Islam. On average, human beings breathe 20,000 times in a day and with each breath they may smell different scents. In addition, according to the Sense of Smell Institute, a normal person can recognize about 10,000 different smells (Bradford & Desrochers, 2009). When someone smells something, the smelling receptors in the brain produce instinctive, immediate actions and emotions (Vlahos, 2007). According to Bell and Bell (2007), 75% of emotions are generated by smell. Grebosz and Wronska (2012) argued that the sense of smell is the most closely related sense to emotional responses, as olfaction is the only sensory information which travels directly to the limbic system with no redirections (Panksepp, 2004). Different odors and smells can also bring about pleasant or unpleasant emotions; some scents and odors can reduce anger (Rétiveau, Chambers, & Milliken, 2004) or improve one's mood (Schiffman, Suggs, & Sattely-Miller, 1995).

2.3.5 Tactile and kinesthetic senses

Skin, as the largest sensory organ, the most fundamental means of contact (Barnett, 1972), and the simplest system among all sensory systems (Geldard, 1960), is the organ through which we can feel the pleasant sensation of a cool gentle breeze or have the painful experience of a hot pot. As Hertenstein,

Holmes, McCullough, and Keltner (2009) suggested, in comparison with other senses, we perceive emotional information more directly through the sense of touch. For instance, Hertenstein (2002) studied the impact of tactile interaction of caregivers on emotional states of infants and found that as the tactile interaction increases, the expression of positive emotions in infants increase, too, as they smile more. The participants of Hertenstein, Keltner, App, Bulleit, and Jaskolka's (2006) study could decode fear, anger, love, sympathy, gratitude, and disgust, but not happiness, sadness, and envy, to name a few, when they were touched by another person.

Horii, Nagai, and Asada (2013) argue that sense of touch is superior to other senses in perceiving emotions and this superiority comes from C-fibers in human skin. It is found that distinct emotions can equally impact on tactile sensitivity. For instance, Kelley and Schmeichel (2014) take the stance that fear (e.g., fear-inducing images) can decrease tactile sensitivity.

2.4 The Objectives of the Study

Taken together, the current study is an attempt to apply a new perspective to intelligence, consolidating EQ and SQ. Making a bridge between senses and their evoked emotions as the by-product of everyday sensory experiences, the paper aims to develop a measure for evaluating individuals' quality of ESQ and further address the following research questions:

1. Does the emo-sensory intelligence scale enjoy construct validity?
2. Are there any significant differences among senses with respect to ESI?
3. Are there any significant differences among ESI components?
4. Does the emo-sensory intelligence scale enjoy predictive validity?

3. Methodology

3.1 Participants

A total of 1500 individuals from all walks of life were recruited to participate in this study based on opportunity sampling. They were 1092 females and

408 males aged 10 to 80 (M = 25.2, SD = 8.1) with Persian as their mother tongue. Prior to initiating the study, which was approved by the Ferdowsi University of Mashhad Ethics Committee, the participants gave written informed consent in accordance with the Declaration of Helsinki, after having been ensured of the confidentiality of their responses. In order to verify the predictive validity of the scale, a number of 103 junior students in English language studies were selected based on convenience sampling. They were 75 females and 28 males aged 20 to 27 (M = 23.4, SD = 2.1) with Persian as their first language.

3.2 Instrumentation

In the first place, the emo-sensory intelligence scale was developed in the participants' native language with 144 five-point Likert-type items tapping the all traditionally recognized senses of hearing, sight, touch, movement, taste, and smell. The participants' emotional expressions were reduced to six primary emotions (i.e., happiness, surprise, sadness, disgust, anger, and fear) from which other complex emotions derive (Ekman, 1992). The items were designed on the basis of a four-component framework, in accordance with COPE guidelines, targeting to measure the extent to which the participants could recognize the basic emotions triggered by their senses, their ability to clearly express and label these emotions, the degree to which they could monitor and control the induced emotions, and finally their ability to guide and manage the resultant emotions to improve their quality of life (Figure 1, Appendix). To avoid various forms of response bias, some items were negatively worded which were eventually reverse scored.

components / senses	Recognition	Labeling	Monitoring	Management
Auditory	Happiness	Happiness	Happiness	Happiness
	Surprise	Surprise	Surprise	Surprise
	Sadness	Sadness	Sadness	Sadness
	Disgust	Disgust	Disgust	Disgust
	Anger	Anger	Anger	Anger
	Fear	Fear	Fear	Fear
Visual	Happiness	Happiness	Happiness	Happiness
	Surprise	Surprise	Surprise	Surprise
	Sadness	Sadness	Sadness	Sadness
	Disgust	Disgust	Disgust	Disgust
	Anger	Anger	Anger	Anger
	Fear	Fear	Fear	Fear
Tactile	Happiness	Happiness	Happiness	Happiness
	Surprise	Surprise	Surprise	Surprise
	Sadness	Sadness	Sadness	Sadness
	Disgust	Disgust	Disgust	Disgust
	Anger	Anger	Anger	Anger
	Fear	Fear	Fear	Fear
Kinesthetic	Happiness	Happiness	Happiness	Happiness
	Surprise	Surprise	Surprise	Surprise
	Sadness	Sadness	Sadness	Sadness
	Disgust	Disgust	Disgust	Disgust
	Anger	Anger	Anger	Anger
	Fear	Fear	Fear	Fear
Gustatory	Happiness	Happiness	Happiness	Happiness
	Surprise	Surprise	Surprise	Surprise
	Sadness	Sadness	Sadness	Sadness
	Disgust	Disgust	Disgust	Disgust
	Anger	Anger	Anger	Anger
	Fear	Fear	Fear	Fear
Olfactory	Happiness	Happiness	Happiness	Happiness
	Surprise	Surprise	Surprise	Surprise
	Sadness	Sadness	Sadness	Sadness
	Disgust	Disgust	Disgust	Disgust
	Anger	Anger	Anger	Anger
	Fear	Fear	Fear	Fear

Figure 1. The four-component framework underlying the ESI scale

3.3 Procedure

To measure ESQ, a 144-item scale was developed under an integrated framework comprising 6 senses and 4 components. In order to ascertain clarity and catch potential problems, the scale was reviewed by some experts in the field and piloted with a group of 50 participants sharing similar characteristics with the sample participants. Afterwards, the participants were all invited to the university the researchers of this paper studied and worked in, over the course of three months (from January 2017 to March 2017) and took the test on paper or Google Docs for their convenience. One of the researchers was always present to respond to their probable questions. Overall, it took nearly 30 minutes for the participants to fill out the scale.

To analyze the data, initially, the internal consistency of the scale, along with its sub-constructs, was measured by Cronbach's alpha (α) coefficients.

As for the first objective of the study, the multitrait-multimethod (MTMM) design was employed to examine the construct validity of the scale through convergent and discriminant validity evidence. Thereafter, using AMOS (version 16) the construct validity of the scale was further verified through confirmatory factor analysis (CFA). To cross validate the scale and reduce the risk of threats to construct validity, Rasch measurement model was applied. To investigate if there are differneces among senses with respect to ESI, and among ESI components themselves, the mean values of the variables were compared using repeated measures ANOVA. Followed by that, Scheffe post hoc test was used to locate the areas of differences. As for the fourth objective of the study, the predictive validity of the scale was likewise evaluated through multiple regression analysis (MRA) for complementary validation.

4. Results

To begin with, Table 1 presents the descriptive statistics of the six senses along with the four components (i.e., recognition, labeling, monitoring, and management) underlying the emo-sensory intelligence scale. As can be seen, the total mean ranges from 3.10 (kinesthetic) to 3.28 (tactile) meaning that, unlike kinesthetic, sense of touch has aroused stronger emotions in our participants. In order to see if the obtained results were significant, further analysis was done.

Table 1
Descrptive Statistics for the Variables: Mean (SD)

Variables	*N.*	Recognition	Labeling	Monitoring	Management	Total
Auditory	1486	3.61 (.90)	2.71 (.73)	3.32 (1.00)	3.01 (.77)	3.16 (.63)
Visual	1483	3.65 (.93)	2.83 (.73)	3.42 (.97)	2.84 (.72)	3.19 (.82)
Tactile	1486	3.58 (1.01)	3.05 (.74)	3.34 (1.08)	3.13 (.79)	3.28 (.74)
Kinesthetic	1478	3.31 (1.02)	2.82 (.73)	3.21 (1.06)	3.06 (.80)	3.10 (.73)
Gustatory	1487	3.45 (.97)	3.04 (.78)	3.19 (1.06)	3.13 (.82)	3.20 (.74)
Olfactory	1484	3.43 (.98)	3.11 (.86)	3.09 (1.07)	3.05 (.81)	3.17 (.86)

4.1 Validation

To verify the internal consistency of the scale, Cronbach's alpha reliability coefficient was used. The results yielded the overall reliability of .80 (gustatory), .81 (tactile), .84 (kinesthetic), .90 (visual), and .91 (auditory and olfactory). Table 2 encapsulates the reliability coefficients for the six senses with respect to the four underlying components.

Table 2
Cronbach's Alpha Reliability Coefficients

Variables	Recognition	Labeling	Monitoring	Management	Whole
Auditory	.96	.79	.84	.87	.91
Visual	.88	.93	.88	.87	.90
Tactile	.75	.82	.77	.82	.81
Kinesthetic	.83	.75	.86	.80	.84
Gustatory	.78	.79	.83	.73	.80
Olfactory	.76	.92	.93	.84	.91

In order to assess the construct validity of the scale three statistical approaches were adopted: The MTMM matrix, the CFA, and the Rasch measurement model. In the following sections each approach will be elaborated in details.

4.2 MTMM

Employing the MTMM design (Campbell & Fiske, 1959) to substantiate the construct validity of the scale, we came up with an MMTN correlation matrix consisting of six methods (i.e., Auditory, Visual, Tactile, Kinesthetic, Gustatory, and Olfactory) and four traits (i.e., Recognition, Verbalizing, Monitoring, and Management). The design provided us with an evaluation of the convergent and discriminant validity of constructs as subcategories of the

construct validity. Table 3 shows the matrix divided into different method blocks enclosed by thick, solid lines. Bolded entries mark the maximum values for the same trait based on different methods (convergent validity) while underlined ones signify the values for different traits measured through the same method (discriminant validity). High heteromethod-monotrait correlations along with low monomethod-heterotrait correlations entail good convergent validity; whereas, low correlations between different traits indicate good discriminant validity. As the table demonstrates, the bolded correlations are larger than the rest of the values (p<.05) in each block evidencing the convergent validity. The underlined correlations are significantly different from zero (p<.05) representing method-related covariation and correlated traits, thus discriminant validity.

4.3 CFA

To address the first aim of the study and surpass correlational matrices underlying discriminant and convergent validity, the scale was substantiated using CFA. The results of CFA specified six models for the six senses comprising the emo-sensory intelligence scale, each including 24 items with 4 latent variables (i.e., recognition, labeling, monitoring, and management) (Figure 2).

Table 3
The MTMM Matrix

		Auditory				Visual				Tactile				Kinesthetic				Gustatory				Olfactory			
	Components	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Auditory	Recognition	1																							
	Labeling	.215	1																						
	Monitoring	.647	.188	1																					
	Management	.238	.378	.410	1																				
Visual	Recognition	**.668**	.185	.325	.192	1																			
	Labeling	.292	**.394**	.234	.136	.366	1																		
	Monitoring	.367	.151	**.694**	.280	.585	.277	1																	
	Management	.358	.224	.323	**.498**	.351	.397	.347	1																
Tactile	Recognition	**.582**	.169	.557	.387	**.524**	.141	.207	.299	1															
	Labeling	.359	**.392**	.360	.279	.319	**.310**	.310	.295	.482	1														
	Monitoring	.368	.180	**.612**	.345	.212	.204	**.511**	.281	.695	.452	1													
	Management	.398	.119	.397	**.533**	.391	.218	.372	**.443**	.502	.579	.496	1												
Kinesthetic	Recognition	**.540**	.156	.335	.349	**.476**	.210	.382	.287	**.681**	.417	.608	.449	1											
	Labeling	.312	**.389**	.334	.132	.284	**.319**	.284	.219	.359	**.528**	.367	.545	.443	1										
	Monitoring	.266	.146	**.562**	.244	.225	.200	**.496**	.298	.585	.421	**.682**	.443	.318	.462	1									
	Management	.382	.117	.391	**.539**	.361	.209	.338	**.400**	.436	.529	.424	**.626**	.480	.485	.511	1								
Gustatory	Recognition	**.622**	.182	.353	.409	**.529**	.223	.493	.325	**.723**	.436	.596	.473	**.663**	.384	.377	.153	1							
	Labeling	.424	**.319**	.424	.439	.378	**.328**	.379	.380	.491	**.519**	.448	.531	.361	**.513**	.342	.298	.232	1						
	Monitoring	.498	.172	**.618**	.341	.129	.191	**.515**	.303	.304	.405	**.708**	.432	.309	.389	**.672**	.233	.287	.528	1					
	Management	.407	.134	.411	**.523**	.377	.273	.368	**.429**	.490	.246	.453	**.670**	.453	.212	.429	**.602**	.227	.597	.511	1				
Olfactory	Recognition	**.645**	.203	.288	.208	**.544**	.149	.508	.326	**.631**	.397	.522	.447	**.612**	.367	.227	.227	**.695**	.248	.391	.266	1			
	Labeling	.386	**.290**	.243	.228	.325	**.287**	.317	.259	.492	**.437**	.433	.472	.377	**.467**	.360	.234	.254	**.537**	.316	.292	.636	1		
	Monitoring	.311	.178	**.664**	.334	.393	.185	**.539**	.299	.234	.342	**.621**	.380	.327	.354	**.617**	.273	.274	.255	**.711**	.307	.461	.571	1	
	Management	.241	.132	.209	**.563**	.380	.152	.343	**.402**	.447	.234	.408	**.599**	.216	.351	.395	**.551**	.386	.302	.351	**.615**	.390	.544	.452	1

* All correlations are significant at the $\alpha < .05$ level

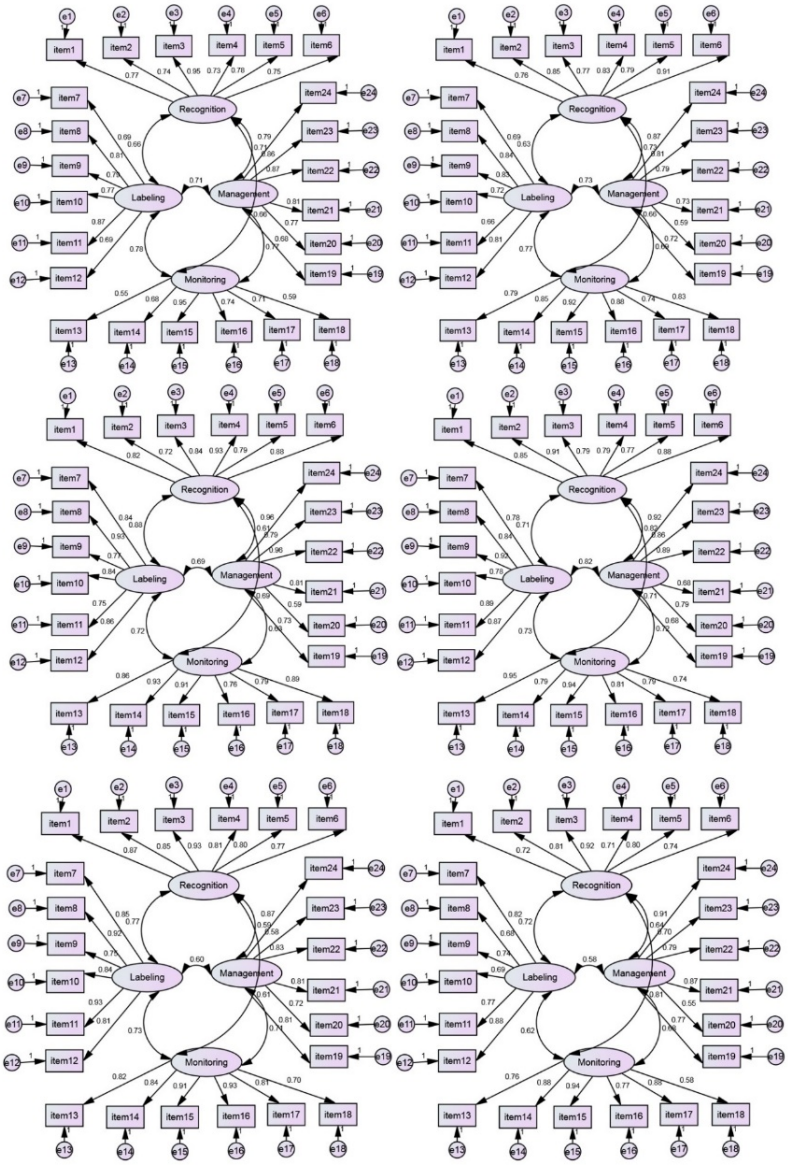

Figure 2. The results of CFA (auditory, tactile, visual, olfactory, kinesthetic, & gustatory)

Figure 2 illustrates the structure of the senses encompassing the interwoven relationships between the 4 components and the relevant 24 items. Within the SEM model, the path numbers are indicators of the correlation coefficients. While rectangles symbolize observed variables, circles stand for latent variables. Based on the results, it is concluded that the items represent the components of the senses well.

To examine the viability of the hypothesized models for the scale, goodness of fit measures were checked in AMOS (Table 4).

Table 4
Goodness of Fit Indices

Fit index	χ^2/df	GFI	TLI	CFI	RMSEA
Model for Auditory	2.45	.91	.91	.93	.05
Model for Visual	2.11	.90	.91	.96	.04
Model for Tactile	2.23	.91	.99	.95	.04
Model for Kinesthetic	2.42	.97	.92	.92	.05
Model for Gustatory	2.01	.94	.91	.94	.05
Model for Olfactory	2.11	.93	.97	.93	.02

The goodness of fit indices used in this study were the relative chi-square which equals the chi-square index divided by the degrees of freedom ($\chi 2/df$), goodness of fit index (GFI), Tucker-Lewis index (TLI), comparative fit index (CFI), and root mean-square error of approximation (RMSEA). According to MacCallum, Browne, and Sugawara (1996), a fit model is considered to be acceptable based on some criteria. In this regard, TLI and CFI should be above .90, while RMSEA and $\chi 2/df$ should be lower than .08, and 3, respectively. Thus, based on the results presented in Table 4, all of the goodness of fit indices were above the cut-off points, indicating that the factor structures of the scale have been confirmed by CFA.

4.4. Rasch

To cross-validate the scale and confirm the uni-dimensionality of each component, Rasch measurement model was employed using the WINSTEPS software (Linacre, 2009). This psychometric technique is in fact a special case of item response theory (IRT) which is particularly concerned with measurements in life sciences education and psychology. This measurement procedure rejects the concept of raw scores and provides person and item estimates that are placed on an interval scale. Being capable of yielding

separate estimates for item difficulty and person abilities, Rasch is item and person free (Andrich, 1978). The application of Rasch in this study provided us with item separation index, person separation index, item reliability, and person reliability for each single component. The overall analysis revealed that all items lie within the acceptable ranges substantiating the validity of the test (Table 5). To explicate, the indices for person separation and item separation of the components varied from 2.58 to 5.99 and 3.12 to 5.78, implying that the items are sensitive enough to distinguish between high and low performers, and the sample population is large enough to account for the construct validity of the instrument. The values for the person and item reliability of the components ranged from .86 to .99 and .83 to .98, respectively.

Table 5
Summaries of Measured Items and Persons

Senses	Components	Item Separation Index	Item Reliability	Person Separation Index	Person Reliability
Auditory	Recognition	5.21	0.93	2.98	0.92
	Verbalizing	4.28	0.97	2.98	0.91
	Monitoring	5.44	0.93	3.12	0.93
	Management	3.78	0.91	2.58	0.93
Visual	Recognition	5.43	0.93	5.95	0.89
	Verbalizing	5.78	0.88	4.75	0.91
	Monitoring	4.89	0.92	3.18	0.95
	Management	5.44	0.94	5.45	0.89
Tactile	Recognition	4.99	0.93	4.45	0.87
	Verbalizing	4.68	0.91	3.99	0.89
	Monitoring	5.11	0.94	3.44	0.93
	Management	4.28	0.88	3.48	0.88
Kinesthetic	Recognition	5.23	0.86	4.65	0.92
	Verbalizing	4.33	0.97	4.54	0.91
	Monitoring	3.12	0.92	4.41	0.89
	Management	5.28	0.84	3.41	0.82
Gustatory	Recognition	3.95	0.83	3.59	0.93
	Verbalizing	5.61	0.98	5.99	0.87
	Monitoring	4.13	0.92	4.23	0.89
	Management	4.58	0.84	3.32	0.91
Olfactory	Recognition	5.13	0.88	3.28	0.96
	Verbalizing	3.58	0.92	4.28	0.99
	Monitoring	4.16	0.91	3.78	0.92
	Management	5.11	0.93	3.49	0.89

4.5 Repeated Measures ANOVA

With regard to the second aim of the study to identify the extent to which the participants are aware of their sense induced emotions, mean values of the variables were checked (Table 1). In order to see if the differences between the mean values are significant, a repeated measures (within-subjects) ANOVA is employed. Table 6 exhibits the results.

Table 6
Tests of Within-Subjects Effects

	Type III Sum of Squares	*df*	Mean Square	*F*	Sig.	Partial Eta Squared
Sphericity Assumed	24.627	5	4.925	33.235	.000	.022
Greenhouse-Geisser	24.627	4.191	5.876	33.235	.000	.022
Huynh-Feldt	24.627	4.205	5.857	33.235	.000	.022
Lower-bound	24.627	1.000	24.627	33.235	.000	.022

Based on the results, there is a significance difference between the mean values of the six senses ($F = 33.23$, $P < .005$). In order to determine where the differences lie between the six senses, post-hoc tests were run.

Table 7
Pairwise Comparisons of Senses

Senses	**Mean diff.**	**Std. error**	**Sig. (b)**	**Senses**	**Mean diff.**	**Std. error**	**Sig. (b)**
Vis. vs. Aud.	.019	.011	1.000	Aud. vs. Vis.	-.019	.011	1.000
Vis. vs. Olf.	.009	.016	1.000	Aud. vs. Olf.	-.010	.014	1.000
Vis. vs. Gus.	-.036*	.016	1.000	Aud. vs.Gus.	-.045*	.014	.023
Vis. vs. Kin.	.081*	.016	.000	Aud. vs. Kin.	.061*	.015	.001
Vis. vs. Tac.	-.097*	.016	.000	Aud. vs. Tac.	-.116*	.014	.000
Olf. vs. Vis.	-.009	.016	1.000	Gus. vs. Vis.	.036*	.016	1.000
Olf. vs. Aud.	.010	.014	1.000	Gus. vs.Aud.	.045*	.014	.023
Olf. vs. Gus.	-.035*	.013	.091	Gus. vs. Olf.	.035*	.013	.091
Olf. vs. Kin.	.072*	.015	.000	Gus. vs. Kin.	.107*	.013	.000
Olf. vs. Tac.	-.106*	.015	.000	Gus. vs. Tac.	-.071*	.012	.000
Kin. vs. Vis.	-.081*	.016	.000	Tac. vs. Vis.	.097*	.016	.000
Kin. vs. Aud.	-.061*	.015	.001	Tac. vs. Aud.	.116*	.014	.000
Kin. vs. Olf.	-.072*	.015	.000	Tac. vs. Olf.	.106*	.015	.000
Kin. vs. Gus.	-.107*	.013	.000	Tac. vs. Gus.	.071*	.012	.000
Kin. vs. Tac.	-.177*	.013	.000	Tac. vs. Kin.	.177*	.013	.000

Meeting the assumption of sphericity and controlling the risk of type 1 error (Pallant, 2011) Scheffe post hoc test was used to locate the areas of

differences. Scheffe test is in fact a more cautious method to reduce the risk of type I error in comparison with other post hoc tests. The results of Scheffe's test indicated significant differences between some pairs. Put in a nutshell, participants were more aware of the emotions induced from their tactile sense (M = 3.28). Subsequent to that, gustatory goes with M = 3.21, Visual (M = 3.19), olfactory (M = 3.18), and auditory (M = 3.17) senses with almost similar indices take the third place. Kinesthetic, with the smallest mean, signifies the participants' lowest awareness of its induced emotions.

Tactile	>	**Gustatory**	>	**Visual** / **Olfactory** / **Auditory**	>	**Kinesthetic**
M=3.28 (.73)		*M*=3.21 (.74)		*M*=3.19 (.62) *M*=3.18 (.76) *M*=3.17 (.63)		*M*=3.11 (.73)

The third aim of this study was to examine to what extent participants are able to recognize, label, monitor, and manage their sense-induced emotions. To do so, repeated measures ANOVA were applied to the four components of the scale. Table 8 shows the statistical significance of the mean differences.

Table 8
Tests of Within-Subjects Effects

	Type III Sum of Squares	*df*	Mean Square	*F*	Sig.	Partial Eta Squared
Sphericity Assumed	285.51	3	95.017	529.634	.000	.268
Greenhouse-Geisser	285.51	2.132	133.711	529.634	.000	.268
Huynh-Feldt	285.51	2.135	133.509	529.634	.000	.268
Lower-bound	285.51	1	285.51		.000	

As can be seen, there is a significance difference between the means of the four components (F = 529.634, P < .005). In order to locate the exact difference, post-hoc tests were conducted (Table 9).

Table 9
Pairwise Comparisons of sub-categories

Sub-Categories	Mean diff.	Std. error	Sig. (b)	Sub-Categories	Mean diff.	Std. error	Sig. (b)
Rcg. vs. Lbl.	.579*	.016	.000	Lbl. vs. Rcg.	-.579*	.016	.000
Rcg. vs. Mnt.	.237*	.014	.000	Lbl. vs. Mnt.	-.342*	.018	.000
Rcg. vs. Mng.	.462*	.016	.000	Lbl. vs. Mng.	-.117*	.010	.000
Mnt. vs. Rcg.	-.237*	.014	.000	Mng. vs. Rcg.	-.462*	.016	.000
Mnt. vs. Lbl.	.342*	.018	.000	Mng. vs. Lbl.	.117*	.010	.000
Mnt. vs. Mng.	.225*	.018	.000	Mng. vs. Mnt.	-.225*	.018	.000

According to the results of Scheffe's test, the differences in the mean values were statistically significant in all pairs. To specify, the participants could basically recognize (*M*=3.51) their sense induced emotions. Thereafter, to a lesser extent, they could monitor (*M*=3.27) and manage (*M*=3.05) those emotions. Yet, they were least able to express and label their sensory emotions (*M*=2.93).

Recognition > **Monitoring** > **Management** > **Labeling**
M=3.51 (.80) *M*=3.27 (.86) *M*=3.05 (.61) *M*=2.93 (.54)

4.6 Predictive Validity

In order to confirm the predictive validity of the whole scale, we investigated the sub-constructs as the predictors of the students' GPA (Table 10). The results obtained from a series of MRA -the enter method- reflected that, 49% (R^2= .49, p<.05) of the variance in GPA is explained by three components of auditory ESQ (i.e., recognition, monitoring, and management) and 44% (R^2= .44, p<.05) of the variance in GPA is explained by three components of visual ESQ (i.e., recognition, monitoring, and management). Moreover, one of the components of the sense of movement accounts for 19% (R^2= .19, p<.05) of the variance in GPA. The Beta coefficients suggest significant,

positive associations between the components of the subscales and the students' GPA.

Table 10
Multiple Regression Analyses for GPA

Model	Predictors	Components	R	R^2	Adjusted R^2	B	P
1	Olfactory	Recognition	.21	.04	.02	.09	.00
		Verbalizing				.27	.53
		Monitoring				.18	.12
		Management				.21	.06
1	Auditory	Recognition	.70	.49	.47	.27	.04
		Verbalizing				.07	.43
		Monitoring				.34	.00
		Management				.22	.04
1	Visual	Recognition	.67	.44	.40	.24	.04
		Verbalizing				.03	.74
		Monitoring				.23	.02
		Management				.26	.01
1	Tactile	Recognition	.18	.03	.02	.16	.19
		Verbalizing				.15	.14
		Monitoring				.23	.07
		Management				.27	.06
1	Kinesthetic	Recognition	.44	.19	.17	.18	.11
		Verbalizing				.27	.01
		Monitoring				.22	.06
		Management				.08	.45
1	Gustatory	Recognition	.19	.03	.02	.14	.36
		Verbalizing				.18	.20
		Monitoring				.27	.06
		Management				.13	.28

5. Discussion

Initiating with a brief sketch on the history of the mainstream theories of intelligence, and highlighting the contribution of emotions, senses, and sensory emotions to the field, the authors suggested that the fragmented theories of intelligence have all taken a one-sided stance toward this concept. They, therefore, endeavored to put forward a framework encompassing the

mainstream theories of intelligence by providing a well-rounded view toward the said concept. In this regard, ESI, as the conciliatory approach encasing the up-to-date views of intelligence (IQ, EQ, and SQ), was presented. In its light, intelligence was hypothesized to be tied to the power of recognition, clarity of expression, monitoring, and the ability of managing sense-induced emotions. This study, in fact, pursued three objectives: to design a scale measuring ESI, to measure Iranians' ESI, and to specify the major ESI components.

With respect to the first objective of this study, a scale measuring ESQ was developed and validated through a variety of statistical approaches. In the first place, the convergent and discriminant validity of the scale, as the subtypes of construct validity, were verified through the MTMM matrix. As for the CFA, the models were fit, measuring four components: recognition, labeling, monitoring, and management. The scale consists of six senses (auditory, visual, tactile, kinesthetic, smell, and taste), each of which measures six sense-induced emotions (happiness, sadness, anger, fear, surprise, and disgust). Rasch model was then utilized and the unidimensionality of the subscales was approved. Overall, the conceptual ESI framework was found to be valid and can be used for further analyses. There has been a major logic behind formulating ESI and developing a formal means of measuring the concept. Cognitive faculties of the mind have long been the dependent variable in the studies of intelligence. Following an assumed cause and effect relationship, researchers have constantly endeavored to pinpoint the relative causes of cognitive strength (e.g., Binet & Simon, 1905a; Cherniss, 2004). As a result, almost all later research in the field oriented toward predicting the factors which give rise to cognitive functioning. The emergence of theories of mind, whether it be IQ, EQ, or SQ, brought forward evidence that cognition and therefore perception is

structured by not only intellect, but also emotion (the theory of emotional relativity (Justice, 1996)) and senses (sensory relativity hypothesis (Pishghadam et al., 2016). Providing a breakthrough in intelligence research, in this study, we pursued this frame of mind and expanded the contemporary view of intelligence to encompass a vaster range of emotions. Being an integrating intelligence, ESQ shares some of its underlying constructs with those of SQ (Lombard, 2007) and EQ (Goleman, 1995). The senses characterizing the scale are grounded in the SQ theory. There also seems to be partial overlap between certain features of EQ and ESQ due to their complementary nature. The two broadly agreed upon components of EQ (i.e., awareness and management), constitute ESQ since sensory emotional reflexes are indeed unconscious and thus call for mental awareness and further management to lead to a wide range of real-life outcomes. While EQ deals with emotions in general, ESQ's emotions are directly predicated on senses. The development of EQ supports the enrichment of ESQ whose growth is closely associated with the changes in one's SQ.

Inter alia, the newly developed theory of ESQ is consistent with the phenomenological or qualitative dimension of sensation (technically referred to as qualia (Lewis, 1929) and studies digging into the circular loop connecting senses and emotions. Briefly put, the "What's it like to be?" argument rendering the subjective properties of one’s sensory experiences in forms of visual quale, gustatory quale, auditory quale, etc. corroborate the core principles of our theory. While discussions of qualia segregate sensation from perception, maintaining that qualia precede perception (Jackson, 1982), ESQ integrates the two, concentrating on the emotions derived from sensory perceptions.

With regard to the second objective of the study, the results of the repeated measures analysis and the post-hoc tests revealed that our

participants' ESQ is high for tactile and low for kinesthetic. Considering Iran's emotional, collectivist culture (Hofstede, 2001), which chiefly centers around interconnectedness and affective values, it is no wonder to find that the sense of touch is appreciated more by Iranians. They are mostly Muslims and according to Islamic rules and practices, it is important to know what is legitimate/illegitimate to touch. That is to say, raising awareness of what they are allowed or strictly forbidden to touch develops their ESQ in the same way. Subsequent to the sense of touch, our participants were more emotionally conscious of their gustatory experiences. A possible line of explanation could be that *eating* normally brings fun and joy to life. Owing to the limited entertainment opportunities in Iran and the huge variety of Iranian cuisine, eating has turned into a frequent fun activity. However, the reflection of this could easily be observed in their level of ESQ for the sense of movement.

As to the third objective of the study comparing the four components of the scale, the repeated measures ANOVA indicated that, our participants' ESQ to recognize sense-induced emotions was significantly higher than their ESQ for the rest of the components. To explicate, people endowed with the capacity to consciously recognize their sadness, happiness, anger, and so on possess higher ESQ levels. In contrast, their ESQ in verbalizing their feelings appeared to be the lowest. Although basic emotions are rather universal and stable across cultures (Ekman, 1992), the way people handle them is totally culture-dependent. Based on the cultural norms and established values of the society, Iranians are not confident with communicating their emotions publicly. As a result, emotions turn into a mess that people are not adequately aware of and the ESQ level drops correspondingly.

To address the fourth objective of the study, the predictive validity of the scale was evaluated in relation to the students' GPA. The MRA results

induced that, of all the senses, auditory, visual, and kinesthetic could account for the changes in the students' GPA. Given that the nature of communication and language learning relies heavily on the senses of sight and hearing (and to some extent movement), and that these senses are substantially involved in information processing, individuals with high auditory, visual, and kinesthetic ESQ scores are more likely to maintain a high GPA as well.

Taken together, the overall findings reinforce the efficiency of ESQ. Along with the efforts made to develop mental abilities, in this study we posited that intelligence goes further than just IQ, EQ, and SQ. Casting a conciliatory look at the intelligences, we added an additional perspective to the contemporary conception of intelligence. Employing ESQ, one is able to discriminate between the emotions which cheer him up or let him down, yet most of the people miss out on the opportunity of leading a more comfortable life. It could be pragmatically discussed that people with high levels of ESQ put their best to inject more joy and happiness into their life through manipulating their sensory involvement.

Last but not least, ESQ is still a young theory which requires much theoretical, as well as empirical, investigation. The current study provided some initial evidence, suggesting that not only individual’s perceptions of their immediate environment but also their emotional reactions to said environment could effectively boost the quality of their daily life. Since in this study we did not take all demographic information into account, future efforts could delve into the contribution of different factors to the fluctuations in the ESQ estimates. As an instance, gender differences seem to create systematic changes in one's ESQ profile. It is similarly assumed that, like EQ and SQ, ESQ is also strongly correlated with age. Yet, in-depth exploration of the mediating issues is highly recommended. It is our hope that the newly developed concept of ESQ together with its designed scale

can open up new horizons to other researchers to employ them in various contexts and cultures.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Appendix
The Emo-Sensory Intelligence Scale

Emo-Sensory Intelligence Scale

Gender: Age: Marital status: Occupation:
Residential area:
Educational background: Field of study:
Place of living: Educational level:

Please read the items below and choose numbers 1 to 5 based on the instruction given below.
little =2 very little=1 Very much =5 Much =4 average =3

I know (can distinguish) sounds that make me feel …		**1**	**2**	**3**	**4**	**5**	**Example**
1	sad						
2	surprised						
3	delighted						
4	disgusted						
5	enraged						
6	frightened						
Expressing my feelings toward sounds that are …		**1**	**2**	**3**	**4**	**5**	**Example**
7	surprising is hard for me						
8	frightening is easy for me						
9	delighting is hard for me						
10	saddening is easy for me						
11	enraging is hard for me						
12	disgusting is easy for me						
I can control and monitor the sorts of sounds that have … in the past.		**1**	**2**	**3**	**4**	**5**	**Example**
13	frightened me						
14	delighted me						
15	enraged me						
16	saddened me						
17	surprised me						
18	disgusted me						
Refraining from listening to sounds that …		**1**	**2**	**3**	**4**	**5**	**Example**
19	sadden me is easy for me						
20	delight me is hard for me						
21	surprise me is possible for me						
22	enrage me is easy for me						
23	disgust me is hard for me						
24	frighten me is hard for me						

I know (can distinguish) images that make me feel …		**1**	**2**	**3**	**4**	**5**	**Example**
1	sad						
2	surprised						
3	delighted						
4	disgusted						
5	enraged						
6	frightened						
Expressing my feelings toward images that are …		**1**	**2**	**3**	**4**	**5**	**Example**
7	surprising is hard for me						
8	frightening is easy for me						
9	delighting is hard for me						
10	saddening is easy for me						
11	enraging is hard for me						
12	disgusting is easy for me						
I can control and monitor the sorts of images that have … in the past.		**1**	**2**	**3**	**4**	**5**	**Example**
13	frightened me						
14	delighted me						
15	enraged me						
16	saddened me						
17	surprised me						
18	disgusted me						
Refraining from looking at things that …		**1**	**2**	**3**	**4**	**5**	**Example**
19	sadden me is easy for me						
20	delight me is hard for me						
21	surprise me is possible for me						
22	enrage me is easy for me						
23	disgust me is hard for me						
24	frighten me is hard for me						

I know (can distinguish) things whose touch makes me feel …		**1**	**2**	**3**	**4**	**5**	**Example**
1	sad						
2	surprised						
3	delighted						
4	disgusted						
5	enraged						
6	frightened						
Expressing my feelings toward the things whose touch is …		**1**	**2**	**3**	**4**	**5**	**Example**
7	surprising is hard for me						
8	frightening is easy for me						
9	delighting is hard for me						
10	saddening is easy for me						
11	enraging is hard for me						
12	disgusting is easy for me						
I can control and monitor the things whose touch has … in the past.		**1**	**2**	**3**	**4**	**5**	**Example**
13	frightened me						
14	delighted me						
15	enraged me						
16	saddened me						
17	surprised me						
18	disgusted me						
Refraining from touching things that …		**1**	**2**	**3**	**4**	**5**	**Example**
19	sadden me is easy for me						
20	delight me is hard for me						
21	surprise me is possible for me						
22	enrage me is easy for me						
23	disgust me is hard for me						
24	frighten me is hard for me						

I know (can distinguish) physical movements that make me feel …		**1**	**2**	**3**	**4**	**5**	**Example**
1	sad						
2	surprised						
3	delighted						
4	disgusted						
5	enraged						
6	Frightened						
Expressing my feelings toward physical movements that are …		**1**	**2**	**3**	**4**	**5**	**Example**
7	surprising is hard for me						
8	frightening is easy for me						
9	delighting is hard for me						
10	saddening is easy for me						
11	enraging is hard for me						
12	disgusting is easy for me						
I can control and monitor the sorts of physical movements that have … in the past.		**1**	**2**	**3**	**4**	**5**	**Example**
13	frightened me						
14	delighted me						
15	enraged me						
16	saddened me						
17	surprised me						
18	disgusted me						
Refraining from making physical movements that …		**1**	**2**	**3**	**4**	**5**	**Example**
19	sadden me is easy for me						
20	delight me is hard for me						
21	surprise me is possible for me						
22	enrage me is easy for me						
23	disgust me is hard for me						
24	frighten me is hard for me						

I know (can distinguish) what smells make me feel …		**1**	**2**	**3**	**4**	**5**	**Example**
1	sad						
2	surprised						
3	delighted						
4	disgusted						
5	enraged						
6	frightened						
Expressing my feelings toward smells that are …		**1**	**2**	**3**	**4**	**5**	**Example**
7	surprising is hard for me						
8	frightening is easy for me						
9	delighting is hard for me						
10	saddening is easy for me						
11	enraging is hard for me						
12	disgusting is easy for me						
I can control and monitor the sorts of smells that have … in the past.		**1**	**2**	**3**	**4**	**5**	**Example**
13	frightened me						
14	delighted me						
15	enraged me						
16	saddened me						
17	surprised me						
18	disgusted me						
Refraining from smelling things that …		**1**	**2**	**3**	**4**	**5**	**Example**
19	sadden me is easy for me						
20	delight me is hard for me						
21	surprise me is possible for me						
22	enrage me is easy for me						
23	disgust me is hard for me						
24	frighten me is hard for me						