Internalization and Externalization in a Computerized L2 Context from Vygotskian Optique

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Abstract

The introduction of Vygotsky's sociocultural theory (SCT) into the second language (L2) domain provides a potential site to explore the mechanisms underlying L2 learners' cognitive modification and the transformation of social understanding into the personal one. This study provided a picture of L2 personalization in two groups of advanced and intermediate English Language (EL) learners. Software was designed to present 25 consecutive statements and capture two groups of EL learners' intra-psychological process by asking them to present their perspective toward a social event in two ways: a) giving punishment and blame scores to the main character; and b) provide oral comment for each episode. The software also recorded the two groups of learners' response latency. The findings brought to surface L2 sociogenetic mental functioning in internalization/externalization process and presented the evidence of individualistic personalization in EL learners. The learners transformed the presented contexts through internalizing/externalizing their intra-mental operations by interpolating and integrating their personal beliefs and knowledge.

Keywords: *Sociocultural Theory, Cognitive Modification, Internalization/Externalization, Sociogenetic Mental Functioning*

[1]Introduction

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Vygotsky's sociocultural theory (SCT) put emphasis on the duality of human's mental functioning at social and personal levels (Lantolf, 2003). Contrary to the dichotomous psychological perspective, Vygotsky held a unifying view toward social and mental processing. Vygotsky (1994) used the term internalization or "ingrowing" (Vygotsky, 1994, p. 65) to conceptualize the process of meaning-making as a mutual move from inter-mental to intra-mental world. In other words, the cognitive functioning performs as a social process (between an "I" and a "You") at the inter-personal level; then, it shifts to intrapersonal process (between "I" and "Me") (Vygotsky, 1978, p. 56).

Socio-cognitive experts (e.g., Lawrence & Valsiner, 2003; Vives et al., 2018) have strived to propose theories to capture this concurrent dualistic cognitive functioning. Although this relation has reached the center of the attention (Valsiner & van der Veer, 2000) in the first language, little empirical evidence has been presented to elucidate second language (L2) learners' inter-psychological and intra-psychological functioning in a second language learning context (Vives et al., 2018). From a constructivism viewpoint, L2 learning is conceptualized as meaning construction (Kozulin, 2018). Besides, language should be investigated beyond linguistic detail (Saarenkunnas et al., 2003) to provide a broader view of the humans' overall socio-genetic development.

This study addresses a notable gap in the existing literature on second language (L2) acquisition, specifically the limited understanding of how L2 learners internalize and externalize social messages within a mediated learning environment. While previous studies have explored internalization processes in L2 contexts, they have often lacked detailed examination of how learners transform social input into personalized meanings through sign-mediated activities. This research aims to provide a more comprehensive understanding of this process by focusing on how L2 learners encode and interpret social messages, thereby generating personal meanings. The study will contribute to the field by offering empirical insights into the mechanisms of inter/externalization in L2 learners, highlighting the dynamic interplay between external social input and internal cognitive processes.

Literature Review
Sociocultural Theory
The transformation of social understanding into personal understanding could be traced back to Vygotsky's SCT (Vygotsky, 1978). Under the influence of Marx's insight about the effect of environment on shaping human (Lantolf & Thorne, 2006), Vygotsky developed his theory, proposing that human cognitive functioning is mediated socially through interaction with others and culturally through the use of cultural tools (Poehner, 2008; Vygotsky, 1986). SCT put emphasis on "the content, mode of operation, and interrelationships of psychological phenomena that are socially constructed and shared, and are rooted in other social artifacts" (Ratner, 2000, p. 9). Vygotsky (1978) believed that human higher forms of consciousness emerge through social and cultural mediation tools. This process leads to individuals' ability to take control of their mental processing such as attention, perception, and memory. Accordingly, mediations play a crucial role in the transformation of cognitive activities from inter-psychological to intra-psychological level.

Mediation

Following Vygotsky's developmental perspective (Vygotsky, 1978), Kozulin (2003, 2018) proposed physical, symbolic, and psychological tools to conceptualize the role of mediations on an individual higher mental functioning. Elaborating on the concept of mediation, Lantolf (2000) asserts that humans do not act directly on the environment but rely on tools of different types including physical and symbolic to mediate their connection with others and with themselves. He further notes that the symbolic tools include numbers and arithmetic systems, music, art, and more importantly language. According to Lantolf (2004), learning is a mediated process being social in origin and then becoming individual as a result of linguistically mediated interaction. From this point of view, humans' psychological understanding of the world is mediated through symbolic tools like their physical world. In the physical world, for example, one uses a fishing rod to physically mediate his relation with the world around to catch fish. On the abstract level, symbolic tools such as signs, charts, numbers and so forth are used with mediation goals (Kozulin, 2003, Poehner, 2008). According to Vygotsky (1994), these symbolic tools (also known as cultural artifacts) bi-directionally mediate our relationship with the world and with ourselves. Vygotsky considered cognitive development as reaching the ability to mediate one's own inner mental worlds (Poehner, 2008).

Vygotsky's new ontological insight changed the social-mental counter-positioning into a unified position (Valsiner & van der Veer, 2000). Vygotsky (1997) introduced three stages of object, other, and self- regulations that individuals go through to regulate their relation with the world and ultimately reach cognitive development. Object regulation, as the first stage, is an animal-like perception and response to stimuli. The social interaction with others occurs at the level of other regulation. Finally, inner interaction to mediate oneself is the self-regulation stage. Vygotsky (1978) responded to the necessity of a new research methodology to capture individuals' cognitive development by introducing the genetic method. The genetic method attempts to capture children's cognitive development in a process-oriented procedure in which the emerging of a new cognitive development in the course of doing a task is supported by mediation until the individual reaches the ability to do it by him/herself. In this regard, educational context deploys a wide variety of physical and symbolic tools (pen, books, numbers, language, and so forth) to mediate learners toward intra-psychological domain. Moreover, different approaches (e.g., Lantolf & Poehner, 2014; Poehner, 2008) have been proposed to set the path toward learners' internalization and higher mental functioning through provision of face-to-face (e.g., Poehner & Infante, 2019) and computerized mediations (e.g., Bakhoda & Shabani, 2019).

Internalization/Externalization Process

According to Lantolf (2006), "internalization is the process through which members of communities of practice appropriate the symbolic artifacts used in communicative activity and convert them into psychological artifacts that mediate their mental activity" (p.90). Kozulin (2018) believes that new higher mental functions emerge through the internalization process. The emphasis on bi-directionality of internalization process shifted the passive role of a developing child as a recipient in a parent-centered socialization into an active role of social message interpreter. The interaction between inter-psychological and intra-

psychological world not only leads to each other's development but also constructs personalized meaning and interpretation for a human being (Lawrence & Valsiner, 2003). Winegar (1997, p. 31) elaborated on internalization as follow:

> Internalization is a negotiated process of development that is co-constructed both intra- and interpersonally. As such, it is a process of reorganization of the person-environment relationship that itself emerges with person-environment relationships. Through this process, immediate person-environment relationships are reorganized, and some aspects of this reorganization may carry forward to contribute to future reorganization. At least for humans, this process always is socially mediated whether or not other persons are physically present. Some patterns of previous and later person-environment relationships we experience as continuity. (p. 31)

Personal Inner Mental Meaning-Making

The development of the social and personal world microgenetically occurs through internalization and externalization processes over time. Personalized meaning-making out of social events is presented in different models in which personal understanding plays the main role (Valsiner, 2014). From the sociocultural perspective, personalized meaning-making process starts at the inter-psychological level and then emerges at intra-psychological domain. Intra-psychological constructed understanding of a phenomenon is an internal reflection of the inter-psychological version. According to Lawrence and Valsiner (2003, p.725), "The human mind comes to the task of understanding social thought, trailing its own baggage of pre-existing knowledge, beliefs and emotions". Semiotic mediations turn into inner speech to make sense for the interpreter.

Vygotsky (1986) put emphasis on the interrelationship between language and thought as the cornerstone of his SCT. According to Aimin (2013), Vygotsky accepted Saussure's distinction between speech and thought and "believed that language and speech had close connections so that they cannot be separated, which means that in SCT, language and speech have almost the same connotation" (p.164). Therefore, Vygotsky emphasizes that intra-psychological communication plays a key role in construing, internalizing, reconstructing, and expressing new concepts and activities.

Internalization/Externalization Processes

The internalization and externalization processes refer to the intra-mental aspect of speech at both levels of assimilating social messages and expressing the information. The incoming messages take a new form through the internalization process and "compose new messages on the "output" for the social world to experience—and further internalize" (Valsiner, 2014, p. 63). The interaction between social and personal planes leads to the microgenetic development of new personal meaning-makings. The idea for such two-layered process of inter/externalization has been put forward by Lawrence and Valsiner (2003) and Valsiner (2014). The schematic representation of inter/externalization process is depicted in Figure 1:

Figure 1

Internalization/Externalization Process (Borrowed from Valsiner, 2014, p. 71)
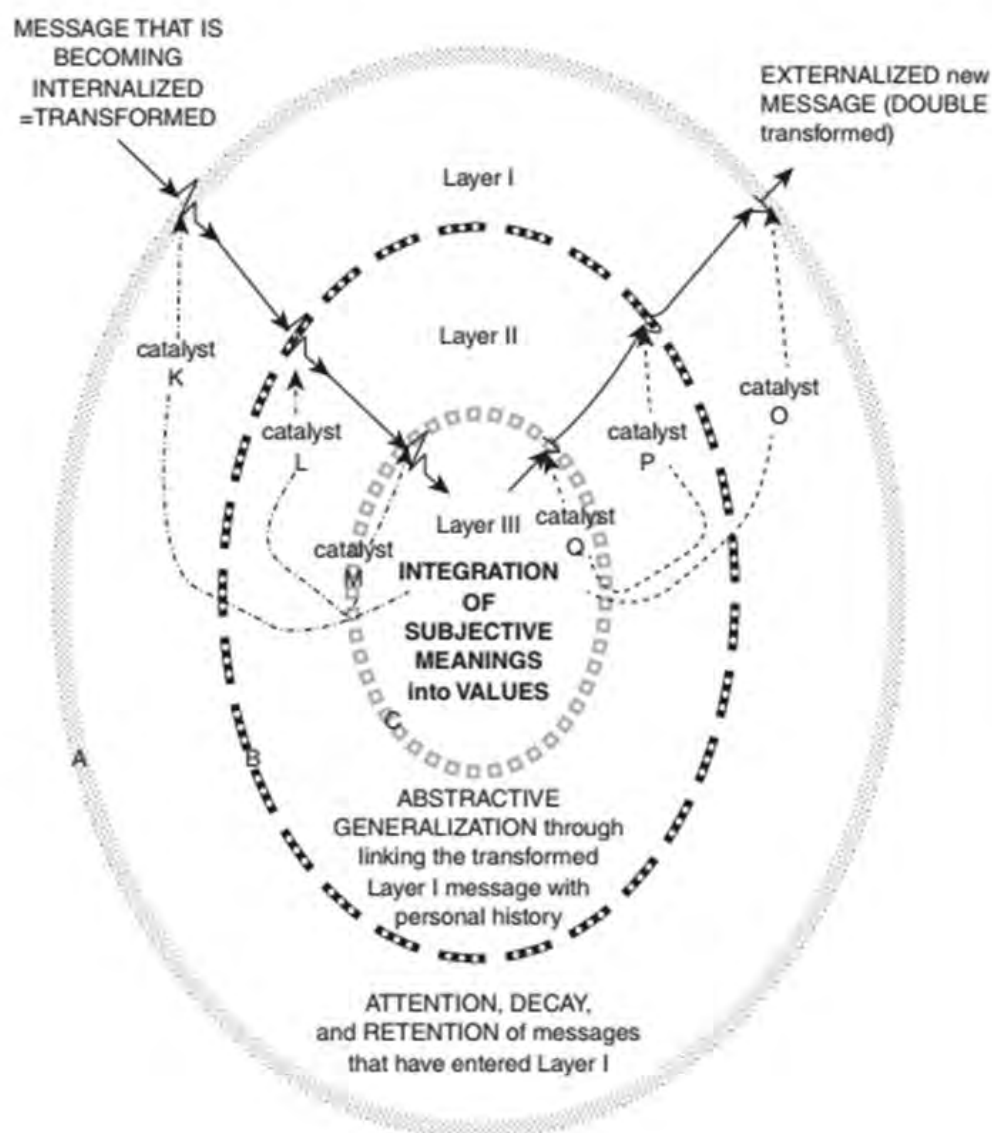
Drawing on Valsiner (2014), three layers comprise the internalization process namely Layer I, Layer II and Layer III. This means that before entering the third layer, a new concept goes through the two outer most layers (see Fig. 1.). On the other hand, the externalization occurs when a concept moves along the three layers in order to be stated. The way internalization and externalization are actualized is lucidly illustrated in the aforementioned model. For internalization to occur, it is essential for any incoming message to go through the three stages of psychological processing. Maintaining, generalizing, and integrating information are the three processes involved in the message transformation at each stage. Valsiner (2014) explains the externalization process and its relationship with internalization in the following way:

> A similar transformation process takes place in the externalization trajectory. An integrated and generalized personal-cultural self-organizer—a "value"—becomes

transcribed into concrete meaningful actions through its transformative contextualization as it is moved through Layer III –> Layer II –> Layer I –> OUTSIDE. As a result, there is no "sameness" implied between the two "outside" materials— the message that was becoming internalized, and the one that emerges as a result of externalization. The person innovates the message as it passes through the boundaries of the layers. (p.72)

Since the layers play an important role in intra-psychological inter/externalization process, each layer will be elaborated in the subsequent subsections.

Layer I: Message Recognition
As the first and outmost boundary, this layer selectively opens and closes toward all incoming social messages. Boundary (K) is responsible for spotting the message that the person tends to internalize and brushes others aside. Selection of incoming messages among many pieces of information protects intra-mental system from overloading information. Without the existence of this message-regulator layer at the outmost border, the human is bombarded with large amount of external messages which lead to polyphony of meanings. Ignoring external noises (e.g., cacophony of car horns, loud radio music, etc.) in order to notice the speaker's message on the other end of the phone line during self-phone talk is an example of this process. This layer "buffers the psyche against the myriad of incoming messages that can be noticed, but that the person considers as "noise" at the given time" (Valsiner, 2014, p. 73). After filtering passing-by information, Catalyst L decides on the transition of messages to Layer II.

Layer II: Cognitive Generalization
On passing through Layer I, a message has the potentiality to be internalized (internalizable), through further processing (maintenance and transformation) hinges on reaching the second layer. Integration of a message into intra-psychological system depends on "the opening of boundary B for the message, by way of the "social regulator" performing a catalytic function (L)" (Valsiner, 2014, p. 73). Here, the message goes through a cognitive transformation process which is heuristic and transforms the message into a new form.

According to Lawrence and Valsiner (2003), the typical human on the daily subjects (politics, business, news, etc.) may be part of the second layer. Also, the inner speech occurs and sometimes reaches to the public domain. Externalization, at this level, covers "abstract problems that are sufficiently far from one's own "core self", which is infinite in its dynamics, may be an activity that only seems to create an image of the person's participation in social issues" (Valsiner, 2014, p. 74). Chatting and gossiping are the result of externalization in the second layer. "Border control" M blocks some materials that enters Layer II from entering into Layer III.

Layer III: Internal Core of Intra-Psychological Domain
Although abstract generalization of the message occurs in the second layer, this does not guarantee the full integration of the massage meaning into intra-psychological domain (Layer III). Boundary C and social regulator M create the potentiality for the message to coalesce

into the core of the psyche (Layer III). If the message reaches Layer III, it becomes the combined part of intra-psychological domain. Valsiner (2014) explained this layer as follows:

> Once a message is taken into the Layer III realm, it acquires deep affective connections with the person—it "touches the person" deeply and profoundly. Layer III is that of deep personal meaningfulness—life feelings in terms of personal generalization—that guide the person's relating with the environment and with oneself. (p. 74)

Affective silence also is a part of externalization at this level. This affective output acts as blocks that do not let the message turn into the verbal code, which is also called "zero signifiers" (Ohnuki-Tierney, 1994). "Funeral procession" is an example that Valsiner (2014, p. 75) employed to depict the affective setting where a person cannot bring him/herself to externalize his/her profound feeling. In this regard, silences often say more than what the words ever can (Valsiner, p. 75).

According to what was discussed earlier, the transformation of social message into intra-psychological domain occurs dualistically. For example, an employee is asked to go to his boss's office to talk about a mistake he has made. While he keeps the event alive in his mind, he creates an imaginative future situation and starts intra-mental dialoguing by moving the event back-and-forth and replays the event intra-psychologically. He tries to make sense out of the social event by considering potential positions and the way he could defend himself in front of his boss. Valsiner (2014) even went further claiming that the person is able to imagine the voice of those who attend the intra-mental interaction.

L2 Internalization/Externalization Research

The introduction of Vygotskian perspective into the L2 domain serves as a potential site to explore the mechanisms underlying L2 learners' cognitive modification (Poehner, 2008). A few researches (e.g., Poehner & Lantolf, 2013) have striven to indirectly capture the L2 internalization/externalization dynamic process through analyzing learners' independent functioning (known as zone of actual development) in association with their dependent functioning (known as zone of proximal development). Such cognitive assessment is theoretically rooted in Vygotsky's concept of 'cultural artefact' and its critical role in the regulation of inter-psychological processing, which construes assessment and instruction as a unified enterprise (see Poehner, 2008). Engaged in L2 activities, the learners experience more complex mental functioning as a result of intermental mediation offered either by humans (e.g., Alavi et al., 2012; Poehner & van Compernolle, 2011) or computer (Bakhoda & Shabani, 2016).

In order to reveal different dimensions of L2 internalization and externalization mechanism, L2 researchers have also placed emphasis on L2 learners' inner speech. Following Vygotsky's (1986) perspective toward psychological interface between thought and language, researchers (e.g., Gabryś-Barker, 2015; Pavlenko, 1997) found that bilingual conceptual store modification may involve internalization of new concepts. L2 private speech has been considered as evidence for both L2 externalization (e.g., McCafferty, 1994; Tai & Khabbazbashi, 2019) and internalization processes (e.g., Lantolf, 2003). Qin, Ouyang and

Ren (2023) have also confirmed the facilitative roles of SCOBA (i.e. Schema of a Complete Orienting Basis of an Action) and languaging as a means to internalize scientific concepts while contending that learners' participation in goal-oriented activities (externalization) helps them internalize scientific concepts and at the same time provide feedback to inform and guide the instructional process.

Computerized-Mediated L2 Internalization

Dynamic assessment (DA) is a learning-oriented assessment approach which is designed to capture learners' developed and developing abilities via a mediated procedure (Poehner, 2008). It takes the learners' responsiveness to mediation as a measure of their underlying potential (Poehner & Lantolf, 2013). The L2 DA literature being still in its infancy has recently observed a new surge of interest in applying a computerized DA (CDA) to test its efficiency in simultaneously assessing and fostering different language abilities. A pioneering work was reported by Teo (2012) who tested the applicability of CDA in helping the learners internalize the metacognitive ability of inference making in reading comprehension tests. She argued that in the absence of human mediators the computer can act as 'a more competence peer' to facilitate L2 learners' development. She further noted that CDA can "allow for the internalization of information, which in turn help promote learners' potential development and assess the learners' reading levels in the process of learning." (Teo, 2012, p. 16)

To test the feasibility of integrating L2 learners' mediating preferences into a C-DA procedure, Bakhoda and Shabani (2019) reported a project in which the subjects were asked to freely select pre-scripted prompts (i.e., electronic mediation) following their own visual, audio, and textual learning preferences to tackle over reading comprehension questions. The Learning Potential Scores (LPSs i.e. learners' differential functioning between unmediated and mediated sessions) based on the learners' own mediation tendencies brought to surface the potential and differential role of visual, audio, and textual mediations in assisting the learners to reach independency in grasping the main ideas of reading comprehension passages.

Ebadi et al. (2018) reported a CDA procedure to display the instruction of L2 vocabulary through lexical inferencing as an acquisition strategy. Their CDA test offered graduated mediational hints to help the learners make use of the co-text, background and world knowledge and discover the meaning of unfamiliar words in the reading texts. Their results confirmed the superior performance of the DA group over the SA (static assessment) group which did not receive any mediational prompts when inferencing the meaning of the new words. The study by Shabani (2022) tested the diagnostic and instructional potentials of CDA for L2 vocabulary. The learners who received DA intervention outperformed the Non-DA group and learners with equal actual scores in their independent performance obtained different mediated scores, gained score, and LPS (learning potential score).

The review of CDA studies in the foregoing paragraphs highlights a gap in the literature on the qualitative analysis of the learners' responsiveness to the L2 tasks, indicating a need for sketching how the newly gained knowledge in the mediated CDA sessions is internalized and meaning is constructed by the learners during task performance.

Response Latency (RL)

The abstraction of cognitive functioning in comprehension and production made psycholinguists employ different approaches to uncover this multidimensional information processing. Response latency (i.e. the interval of time between a request for fulfilling a cognitive task and response to it) has been introduced as a tool to analyze the respondents' on-going mental processing while they are responding to the questions (Bakhoda & Shabani, 2016; Mayerl, 2013). Draisma and Dijkstra (2004) claimed that the amount of processing time needed for reaching the correct answer is determined by the loading process of mind. Mulligan et al. (2003) defined RL as the amount of time a learner spends to arrive at the correct answer after the presentation of a question. Mayerl (2013) presented a continuum to distinguish spontaneous from thoughtful responses. In this vein, Bakhoda and Shabani (2016) employed RL to explore L2 learners' developing ability at the presence of implicit to explicit mediations in responding to a computerized reading question. They found that learners with a larger zone of proximal development not only required implicit mediations but also spent shorter RL to tackle the correct answer. To illustrate the potential function of response latency as a tool to discriminate between learners' performances, Paap (2019) noted that taking into account only the 'response accuracy' is vague especially in cases where the testees reach a ceiling effect, and it is essential to include 'response latency' which helps distinguish between learners according to not just accurate responses but how fast they get to the correct response. In their experimental study, Schulz et al. (2023) found that faster response latencies could be taken as a reliable indicator of inhibitory control among children especially when a threshold level of accuracy is surpassed.

Research Questions

Although foreign language researchers have recently attempted to uncover the processes involved in the L2 externalization and internalization activities, learners' personalization of L2 concepts, which are required to enter the core of internalization process (Layer III), is still blur. Specifically, how learners transform these concepts into internalized, personally meaningful representations (Layer III of internalization) is not fully clear. This study aims to bridge this gap by investigating the nuances of how intermediate and advanced English learners (EL) encode and externalize social messages during language tasks, particularly focusing on their personalized meaning-making processes. Given this gap, the following research questions guide the study:

RQ1: Is there any significant difference between intermediate and advanced EL learners in personalizing an electronically-presented social event?

RQ2: What does EL learners' semiotic and verbalized externalization out of a consecutive social event reveal about their intra-mental functioning?

RQ3: Is there any significant difference between intermediate and advanced EL learners' RL in externalizing their inner thought to an electronically-presented social event?

Method

Study Design

This study required empirical data to uncover EL learners' intra-mental processing. More precisely, it followed Lawrence and Valsiner's (2003) model to bring to surface two groups of

EL learners' mental processing at the intra-psychological level. The electronic presentation of the social event provided the context to gradually tailor the mediation to the arising needs of the learner through either addition or deletion of some information to the presented task. Since the main focus of this study was on EL learners' personalization of social messages, the content of the social event was "semiotically over-determined" (Valsiner, 2001) to be presented to the participants. Lawrence and Valsiner (2003, p.737) define the term as "the encoding of the same phenomenon by way of more than one sign". With each presentation of the social event, the learners had the chance to ponder and create their own personal meanings. In the present study, to detect the learners' microgenetic development their assigned blame and punishment scores together with their verbalized comments on the main character of the social event were recorded. Moreover, drawing on Bakhoda and Shabani (2016) and Draisma and Dijkstra's (2004) approach, the present study considered the learners' RL in assigning scores as an indication of their online mental functioning.

Participants

This study followed a non-probability sampling design to recruit two groups of EL learners at the intermediate and advanced level. Initially, an attempt was made to select the participants from those with sufficient English language learning experience. Next, after administering the Oxford Placement Test (OPT) the final cohorts comprised of 20 intermediate learners out of 93 learners and 20 advanced EL learners out of 66 were recruited from 5 language institutes in Mazandaran, Iran.

For each level of proficiency, those who scored 1 standard deviation (SD) above and 1 SD below the mean were selected to participate in this study. The demography and background of the selected learners are presented in Table 1:

Table 1
Descriptive Analysis of the EL Learners at the Outset of the Study

N	Age	Median	S.D	Variance	Period of Studying English
93	16-20	27.07	5.73	32.9	2-4 years
66	22-31	45.69	7.1	50.7	4-7 years

Procedure of the Study

The learners were presented a number of shoplifting episodes which depicted a girl with the pseudonym Sara. A designed software and computers were used to construct a dualistic social event. The software presented the episodes and recorded learners' active RL, and the learners' scores to Sara's action in the form of punishment or blame. In line with Lawrence and Valsiner's (2003) study, Sara's action was the main theme of the presented social event. In each episode, some reasons were proposed to ask the learner either to add to or subtract information from the task.

Table 2

The Computerized Consecutive Statements

N	Social messages
1	Sara was 15 years old and in high school. One day she walked into a store and took a pair of jeans off the rack. She walked out of the store with the jeans without paying for them. The jeans were worth $80.
2	The jeans were displayed invitingly in the store, and it was so easy to take them.
3	Sara's parents were breaking up
4	Sara thought shoplifting might help get her parents' attention
5	Sara sometimes felt that she didn't know who she was, and she was having one of those days.
6	One of the popular girls at school had dared her to try shoplifting.
7	She was anxious to fit in with her friends.
8	Sara thought that shoplifting was a part of the normal growing-up process.
9	Sara had never stolen before.
10	She came from a good family and had never been in trouble.
11	When she was caught, she was very sorry, and decided that it would never happen again
12	She was a good-natured girl.
13	She liked pop music
14	In the store, she put on the jeans in the changing room and then put her own clothes over the top.
15	She waited until the salesperson was in another part of the store, then left taking the jeans.
16	She told her parents that she would be at the library that afternoon.
17	She was bored and thought that shoplifting would give her a boost
18	She found he enjoyed the challenge
19	She had several pairs of jeans at home
20	Her parents gave her plenty of pocket money.
21	Sara's best friend refused to go shoplifting with her.
22	Sara's parents had brought her up to believe that stealing was wrong.
23	It felt good to get something for nothing.
24	What is your final reaction to Sara's story?
25	Would you please summarize out loud what you believe to be the main points of Sara's story

The presented social event presented a situation to unravel the respondents' level of cognitive functioning and the empirical framework offered by Lawrence and Valsiner (2003) helped detect the inter/externalization processes and quantitatively measure the learners' meaning-making processes.

Valsiner (2014) argues that to trigger meaning making on the part of an individual, the presented social event should provide him/her with a challenging task which is adequately complex and novel. He emphasized the significant role of an event procedure and design which let the individual manifest his/her intra-psychological talk when engaged in the event over time. In this study's procedure, the participants were asked to assign two distinct scores—one for punishment and one for blame—along with recording their response latency (RL) for each of Sara's actions. The designed software depicted below enabled the researchers to clearly trace the individuals' ongoing thinking:

Figure 2
The Procedure of the Study
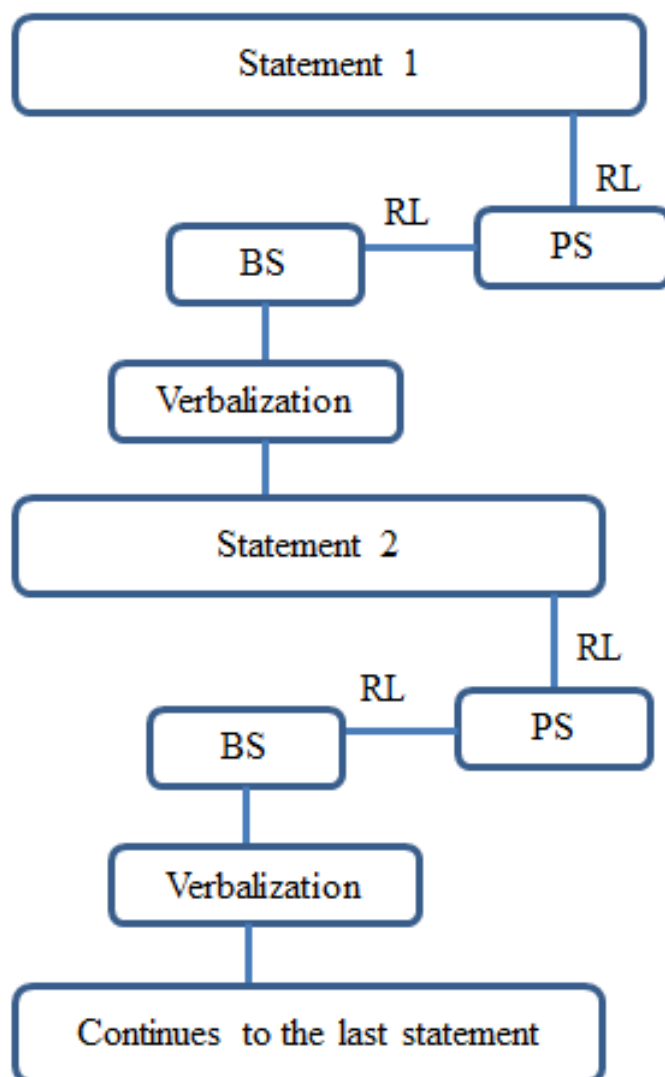
Note: PS = punishment score; BS= blame score; RL= response latency

As is shown in the above figure, each statement was synchronously presented through the text and audio file on the screen. The audio file was a recorded voice of a 34-year-old male English instructor, which was presented at the speed of 120 word per minute. After the presentation of each episode, the learners individually gave two scores (on a scale of 0 to 10) to indicate their judgment of how much punishment and blame Sara deserved for her actions. Meanwhile, the amount of time they spent to give the scores was recorded by the software. Then, the learners were free to express their perspective in L2 after the scoring procedure. Their comments were recorded by the software for further study.

Figure 3
The Overall Study Context to Unravel Inter/Externalization Process
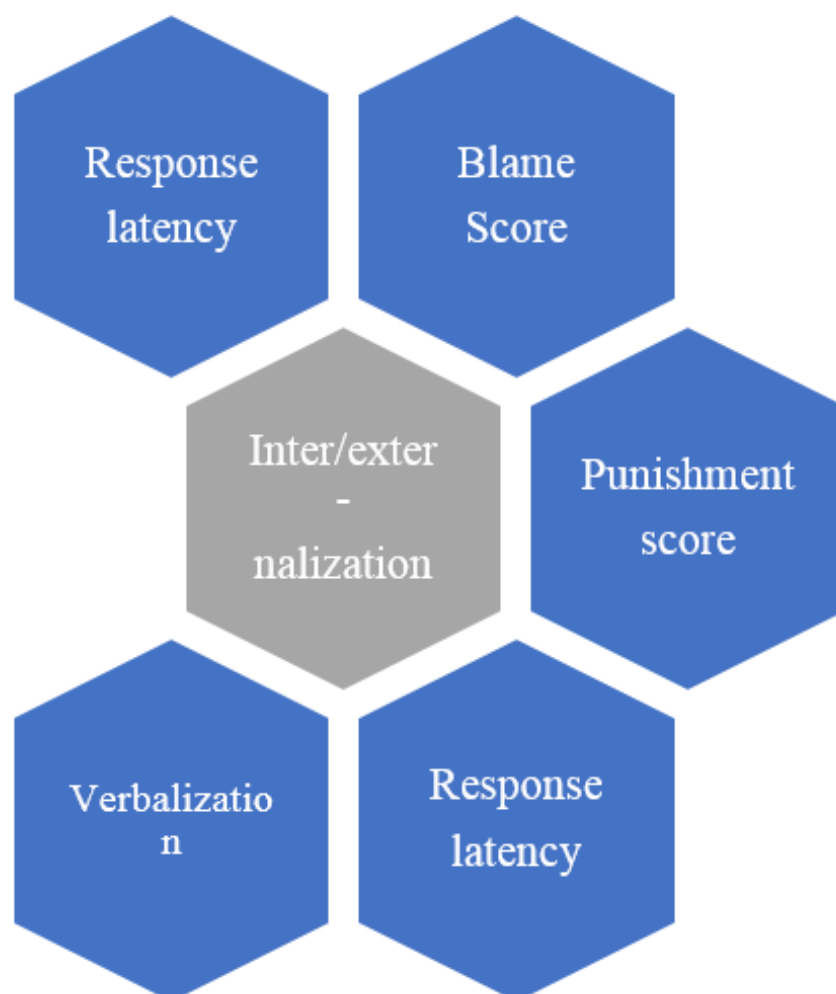
Theoretically, the procedure of data collection was acceptable for unraveling L2 learners' intra-psychological process for a number of reasons:

The presented social event placed emphasis on the presentation of ongoing English input while eliciting L2 learners' output through both giving score and L2 verbalized interpretation. In the words of Frawley (1997), internalization unfolds in an "active, nurturing transformation of externals into personally meaningful experience" (p. 95). During different episodes of the event, the learners were allowed to reveal their intra-personal perspective in an electronically presented setting.

The two forms of collected data based upon the above-mentioned procedure provided a basis for evaluating learners' English responses and their perspective toward accepting or rejecting Sara's action in each episode. The scoring procedure set the context for gaining insights into all learners' reaction toward the social messages while excluding the participants' oral English proficiency differences. However, each individual articulated his/her personalized understanding in English about the presented social messages. Lawrence and Valsiner (2003) contend that providing brief comments along with minimal non-verbal

responses, such as pushing a button, can offer a clear depiction of personal meaning construction.

The learners' English comments along with their punishment and blame scores led the researcher to examine two groups of learners' the social messages over time and concomitantly their internalization/externalization processes.

As mentioned earlier, the software generated a profile containing three forms of data, the given punishment and blame scores, RL of the given scores, and verbalized recorded comments. An independent sample t-test was employed to compare the two groups' blame and punishment scores to provide evidence for the internalization processes. Also, a paired samples t-test was used to compare blame scores with punishment scores in each group to uncover whether the learners differently made sense in Sara's action in terms of punishment and blame scores. For the externalization process, an independent sample t-test was used to compare the intermediate learners' RL in giving blame and punishment scores with the performance of advanced learners. Besides, learners' verbalized responses were analyzed to reveal microgenetic cognitive personalization of the two groups of learners.

The designed research procedure also captured the processing time each learner spent to provide the punishment and blame score on Sara's action. According to Mayerl (2013), RL could reveal the loading information process of learners thinking. Here, the software recorded RL in giving score brought forth an opportunity to explore how learners differ in processing each social episode regarding the Sara's action.

Results

As mentioned earlier, the software generated a profile containing three forms of data, the given punishment and blame scores, RL of the given scores, and verbalized recorded comments. An independent sample t-test was employed to compare the two groups' blame and punishment scores to provide evidence for the internalization processes. Also, a paired samples t-test was used to compare blame scores with punishment scores in each group to uncover whether the learners differently made sense in Sara's action in terms of punishment and blame scores. For the externalization process, an independent sample t-test was used to compare the intermediate learners' RL in giving blame and punishment scores with the performance of advanced learners. Besides, learners' verbalized responses were analyzed to reveal microgenetic cognitive personalization of the two groups of learners.

Scoring and RL Analyses

The comparison of the two groups' given scores to Sara's action opens up an opportunity to follow their understanding from the presented English social event. The following two tables present the descriptive analyses of the two groups' given blame and punishment scores to Sara's action.

Table 3

Descriptive Analyses of the Two Groups' Blame Scores and RL

	Advanced Group	Intermediate Group
Number of learners	20	20
Number of items	25	25
Mean of score	150.40	136.70
Std. deviation of score	15.763	13.887
Std. error mean of score	3.525	3.105
Mean of RL	151.40	176.15
Std. deviation of RL	13.51	18.13
Std. error mean of RL	3.02	4.055

Table 4

Descriptive Analyses of the Two Groups' Punishment Scores and RL

	Advanced Group	Intermediate Group
Number of learners	20	20
Number of items	25	25
Mean of score	143.55	134.00
Std. deviation of score	9.806	12.490
Std. error mean of score	2.193	2.793
Mean of RL	173.80	186.90
Std. deviation of RL	17.35	20.9
Std. error mean of RL	3.88	4.6

Table 5

Reliability of the Two Given Scores

Tests	N of items	N of participants	Mean	S.D.	Cronbach's Alpha
Blame	25	40	143.5	16.22	.89
Punishment	25	40	138.8	12.08	.80

Tables 3 and 4 present the descriptive statistics for the blame and punishment scores and RL while Table 5 reports the reliability of blame and punishment scores. The calculated reliability coefficient indicates a high consistency in the students' given scores.

The independent sample t-test (Table 6) showed significant differences between the two groups' given blame ($t = 2.91$, $p = .0059$, Cohen's $d = .92$) and punishment ($t = 2.68$, $p = .010$, Cohen's $d = .85$) scores, indicating that the two groups perceived Sara's action differently and concomitantly meted out different punishment and blame scores to her action.

Table 6

An Independent Sample t-Tests and Effect Size Comparing the Two Groups' Scores

	Blame score	Punishment score	RL in punishment	RL in blame
t-value	2.91	2.68	2.15	4.8954
Significant	$p = .0059$	$p = .010$	$P = 0.0374$	$P < 0.0001$
Effect size	(136.7 - 150.4) ∕ 14.85 = .92	(134 - 143.55) ∕ 11.22 = .85	(186.9 - 173.8)∕ 19.207 = 0.68	(176.15 - 151.4)∕ 15.98 = 1.54

The t-test uncovered the significant difference between the advanced and intermediate groups' required time to give punishment (t = 2.15, p = 0.0374, Cohen's d =0.68) and blame (t = 4.8954, p < 0.0001, Cohen's d = 1.54) scores to Sara's action. Since there was not any fixed correct punishment and blame scores for each statement, the learners' RL in both blame and punishment scores indicates the load of information processing on their mind to contemplate on appropriate punishment and blame scores to Sara's action.

Since the two groups differently perceived Sara's action and assigned different blame and punishment scores, a paired sample t-test was employed to explore whether there was a significant difference between blame and punishment scores in each group. The following table encapsulates the result of conducted paired sample t-test between the given blame and punishment scores in each group.

Table 7
A Paired Sample t-Tests and Effect Size Comparing the Blame and Punishment Scores

	Advance group	Intermediate group
t-value	2.90	.68
Significant	*p* = .0091	*p* = .5007
Effect size	(150.4 - 143.55)∕13.126 = .521	(136.7 - 134)∕13.208 = .204

The above table reveals that there was a statistical difference between blaming and punishment scores for Sara's action in advanced (t = 2.90, p = .0091, Cohen's d = .521) and intermediate (t = .68, p = .5007, Cohen's d = .204) groups. The difference indicates that learners distinguished blaming from punishment. In other words, they thought that Sara deserved different level of punishment from blame for her action. This divergence was rooted in the perception of blaming and punishing for a wrongdoer.

A Pearson correlation coefficient was employed to test the following: (a) the relationship between learners' punishment and blame scores, (b) the relationship between blame score and RL in giving blame score, and (c) the relationship between punishment score and RL in giving punishment scores. (a) the calculated value of r (for advanced group r = .75 and for intermediate group r = .11) demonstrates a strong positive relationship between the two given scores in the advanced group, but a weak relationship between the two given scores in the intermediate group. In simple words, learners in the advanced group tended to give higher blame score to Sara's action when they gave her high punishment scores. (b) The calculated values of r (r in advanced group= -.0927 and r in intermediate group = -0.048) show weak negative relationship between punishment scores and their pertinent RL in the two groups. In other words, the higher punishment scores were given in a shorter RL. (c) The same analysis was conducted to examine the relationship between the blame score and its RL in the two groups. A weak positive and negative relationship was observed respectively for advanced (r = 0.3604) and intermediate (r = -0.1511) groups. The advanced group members gave higher blame score by spending greater time, while intermediate learners presented higher blame scores by spending shorter RL.

Qualitative Evidence Concerning L2 Internalization/Externalization Process
The qualitative analyses of the learners' responses to the sequenced presented statements could provide a more vivid picture of internalization and externalization process in both

groups. Space does not permit a full analysis of all learners' comments about Sara's action. In this regard, the two (intermediate and advanced) learners' performances on the presented statements were offered in Table 8 below. It encapsulates the two learners' comments on each statement, their punishment and blame scores to Sara's action, and RL in giving punishment and blame scores.

Table 8

Two Samples of Learners' Performance

Qs	Advanced Learner	RLP	RLB	P	B	Intermediate Learner	RLP	RLB	P	B
1	I think she might forget to pay for the jeans. There should be a security guard to remind her.	5	6	2	3	That's not a good job. She robbed it [them].	9	10	5	8
2	Something also sticks to that [pair of pants] shows it belongs to the store.	7	7	3	4	It does not mean that we can take it [them]. In this way, it means she robbed it.	7	9	6	8
3	Their parents are responsible for her wrong action. She went through a lot. No punishment and blame for her.	6	5	1	1	That's why she robbed it.	7	6	2	4
4	They had to take care of her before she did that.	5	5	2	2	She could directly talk to them. That's a correct way.	7	8	4	4
5	That's usual for teens. I had some of those days.	7	5	2	2	That's because of her parents.	8	7	3	4
6	If she steals that pair of pants, then she was responsible for that not the other girls.	6	7	5	4	She has to talk to the school manager and tells him about the girl.	8	5	4	5
7	That's true. Sometimes they ask you something that you cannot reject.	5	7	4	4	She doesn't have a good friend. She should change her friends.	6	7	4	6
8	But shoplifting is illegal and considered as a crime. I never did it.	4	5	6	6	It is not a good...she did a bad job.	7	5	5	8
9	Then, there shouldn't be a serious punishment for her.	5	6	4	4	She does it because of her parents.	9	7	3	3
10	Now, I think it's a big problem for her. They are going to punish her.	7	6	6	5	She should be blame [blamed] for her bad job	8	7	5	8
11	That was too late for her. She has to answer to answer a lot of questions.	5	4	6	6	She should not do it in [at] the first place.	4	6	7	8
12	She experienced some bad emotional events, but it does not mean she [has the] right to	7	6	5	5	So, why she did it. She shouldn't do that.	5	4	4	7

#										
	do such a wrong action.									
13	What does it mean? It does not show anything.	5	3	4	3	It is not a problem. Everyone loves music.	5	5	2	2
14	She has a plan for stealing. Then she was responsible for that. It seems punishment is unavoidable for her.	7	6	6	6	That's why she has bad friends or parent. She wants their attention by [doing] this bad job	8	6	4	7
15	But she did a wrong action. Then, she has to accept its consequences.	8	5	8	7	She should learn new lessons about the bad job she did.	7	6	5	7
16	She lied to steal them. Sure she did it and deserved blame and punishment	6	6	8	8	she surprises her parents in bad way and they will punish her.	7	4	4	7
17	Stealing is not the correct way. She could do some other activities. I go hiking whenever I am bored. She could do it in a correct way.	7	6	7	6	she did a bad job for [a] bad reason.	7	5	4	7
18	Now she deserves high punishment for her wrong behavior	8	7	8	8	It is not good. Stealing is not enjoyable even you are bored.	6	7	6	7
19	For sure she deserves punishment and blame. She did it for enjoyment	5	4	8	8	That's why she did a bad job. She did it for other thing.	7	5	6	7
20	She has everything she needs. She did crime and she should accept the consequences.	5	5	8	8	She has money to buy it but she steals it. She should be blamed for her bad job.	5	5	5	7
21	She insisted to do the wrong action. she even asked her friend to join her. She decided to this wrong behavior. She deserves both blame and punishment.	7	7	8	8	Her friend did the good job she should learn from her. But she did that bad job.	6	5	6	8
22	They did not do enough. She failed by stealing the jeans.	8	6	8	7	She did not listen to her parents. She steals it.	7	4	7	8
23	The wrong action is wrong no matter how she sees it. She deserves punishment for doing it.	9	6	8	8	She did not gain anything.	10	5	7	7
24	She deserves punishment she plans to steal the jeans. She had money but she decided to steal.	10	7	8	8	She did not pay attention to her parents' advices. She is responsible for that.	6	5	7	8
25	She decided to steal	4	5	7	7	She steals it because	4	4	5	7

| jeans from store and asked her friend but she rejected her. She had money to buy the jeans but she stole them | | of her parents. They did not pay attention to her. She did not listen to their advice. |

Note: RLP: Response latency of punishment score; RLB: Response latency of blame score P: punishment score; B: blame score

Personalization

The two selected learners' punishment and blame scores and comments indicate that all learners were seriously engaged in conducting the task. The evidence of learners' personalization is when they put themselves at the center of the attention to justify their given blame and punishment scores. For example, as a comment on statement number 8, the advanced learner said (*But shoplifting is illegal and considered as a crime. I never did it*). to elaborate that this action was not part of his growing up process. As a comment on the same statement, the intermediate learner emphasized on the delinquency of Sara's action. This form of personalization is observable in the advanced learners' comments on statement 7 and in intermediate learners' comments on the statement 3. The two learners considered two different levels of punishment and blame scores for statement 8.

Appraisal Reaction

The transcription of the two learners' comments on Sara's action indicated that they judge the worth of Sara's action at different levels. The judgement was based upon each learner's personal interpretation of the sequenced statement. For example, the intermediate learner's comment on statement 14 (*That's why she has bad friends or parent. She wants their attention by [doing] this bad job*) shows that not only did she consider shoplifting as a wrong action but also she expressed some reasons behind her judgement. The advanced learner had a different interpretation from statement 14. The same appraisal reaction was observable in comments of the advanced learners when he commented on statement 12 (*She experienced some bad emotional events, but it does not mean she [has the] right to do such a wrong action*). The advanced learner refuted the correctness of Sara's action with the interpretation of emotional condition that Sara went through. The differences in blame and punishment scores between the two learners indicate the intensity of their interpretation of the statement.

Meaning Generation and the Scores

The meaning creation was observable in the two learners' comments when they expressed their opinion about each statement. They constructed meaning in the course of exposure to the statements and interpretation of the meaning of each in accordance with their intra-mental dialogue over Sara's condition and action. For example, the advanced learner's comment (*Her parents are responsible for her wrong action. She went through a lot. No punishment and blame for her*) on statement 3 shows a dynamic construction of meaning which created a broader context for Sara. Based upon this generated context, the advanced learner gave Sara the lowest punishment and blame scores. The intermediate learner's comment on the same statement (*That's why she robbed it*) reveals that he interpreted Sara's action as robbing even

though there was not any direct information about it. To construct meaning out of the statement, he considered statement 3 as the cause of Sara's hypothetic robbery.

Another manifestation of meaning construction was the learners' back and forth between their interpretations and the statements. For example, the intermediate learner's comment (*It is not good. Stealing is not enjoyable even you are bored.*) on statement 18 shows that he connected statement 18 with the previous one for his current interpretation. The same meaning construction is observable in the two learners' comments on the last statement to summarize the Sara's action. The learners showed that both their scores and comments were under the influence of presented context. Their meaning construction process vacillated back and forth and revised several times. This revision of understanding was observed in the two selected learners' comments and scores. For example, comparing the advanced learners' comments on statements 16, 18, and 23 unravels that she was not sure whether Sara deserved both high blame and punishment or she just deserved the high punishment.

Discussion

This study strived to unravel L2 meaning-making process out of a sociocultural context among two groups of advanced and intermediate EL learners. The presented social event along with the ongoing English input aimed at capturing the L2 learners' inter/externalization processes through both giving score and verbalized interpretation. Unlike the previous SCT-based researches in L2 context which used computers to render mediation and uncover the learners' ZPD (e.g., Bakhoda & Shabani, 2016; Poehner & Lantolf, 2013), the present study relied on computers as well as software to detect the EL learners' personalized meaning-making processes. The learners' existing differences in their idiosyncratic senses out of Sara's social event were brought to surface, which might have remained inchoate if there were no fine-tuned computer-human interactions. Calibrating Sara's actions constantly via statements encouraged the learners to initiate personal moves at the intrapsychological level for each L2 expression. The first research question sought to find out if there was any significant difference between intermediate and advanced EL learners in personalizing an electronically-presented social event.

The two groups' difference in giving blame and punishment scores to Sara's action proves that L2 meaning construction is not a prescribed, stable, and fixed process. Rather, it is dynamic and variable. Even though the two groups read the same lines of social event with the same language mechanics, they developed a different understanding of Sara's action. The difference was more observable at the individual level (see Table 8). As Herrington and Oliver (2000) claimed, the dynamic nature of meaning makes it untransferrable since it is created solely by the learner him/herself. While the L2 social messages engaged the two groups of learners in giving punishment and blame scores to Sara's action, the social messages needed to emerge at the learners' intra-psychological level in order to form personal meanings (Valsiner, 2014). Making personal sense from social event occurred when the learners transformed the social messages into semiotic scores which followed by justification of their scores through L2 progressive dialogues with oneself. Taking position based upon the presented L2 situations could be construed as the learners' understanding of their social world. Microgenetic changes in the learners' responses and scores showed the dynamic construction of L2 meaning being built upon the social messages. The observation

of discrepancies in each learner's score and verbalization confirmed that each learner capitalized on his or her own repertoire of background knowledge, concepts and feelings to appropriate the presented social context. Drawing on Frawley (1997), internalization is the result of an "active, nurturing transformation of externals into personally meaningful experience" (p. 95).

The intermediate and the advanced learners' difference in giving blame and punishment scores to Sara's action might be rooted in their social understandings, age difference, or the identity each individual developed in learning a new language other than their native one. However, as Flege (2018) claimed, input plays a more important role in comparison with the learners' age.

From the sociocultural view, learning a new language means an opportunity to develop new tools and ways of meaning (Kozulin, 2018) which let the learners to widely create the meanings. The semiotic scoring system carried different meanings for the learners because the type of punishment and blame was open to each learner. As Kramsch (2000) stated, "in Vygotsky's goal-oriented semiotics, signs are a means of regulating others' and one's own behavior" (p. 137). The individualistic personal-cultural world created two different blame and punishment relationships between the two groups of learners.

The second research question was raised to see what the EL learners' semiotic and verbalized externalization out of a consecutive social event reveals about their intra-mental functioning. The study of L2 meaning making process, due to its nature, brings forth the challenge of designing a procedure to have access to the most unobservable emerging process which is multifaceted at the intra-mental level. The conceptualization of L2 learning as the creation of new meaning from SCT's viewpoint required a methodology that captures subjective construction of meanings. The nature of meaning is claimed to be a subjective-oriented phenomenon (Wells, 2007) which microgenetically hinges on the perturbation of the learner's conceptual equilibrium (Can, 2009). The changes in consecutive presentation of L2 statements, in this study, uncovered the learners' meaning making creation when they externalized their intra-psychological interpretation through semiotic system and verbal elaboration. The multiple sources of data (scores, verbalization and RL recordings) made it possible to assess each learner's responses and attitude towards confirming or disconfirming Sara's action in each social event. The present research aligns itself with Lawrence and Valsiner's (2003) studies which claim that minimal comments supported by partial non-verbal responses (e.g., pressing the buttons) could bring to surface the learner's personal meaning making.

Applied linguists (e.g., Romero-Rivas et al., 2016) contend that making causal inferences from L2 discourse brings extra processing for L2 speakers. Social psychologists (Bakhoda & Shabani, 2016; Bassili & Krosnick, 2000) claim that shorter RL reveals the stronger, more accessible, and more stable attitude. The appropriation of social messages into intra-psychological plane by the learner exerts a demand on the cognitive processing. Each learner demanded a certain amount of time to transfer the social messages to his/her intra-mental plane of psychological processing.

As its prime focus, the third research question was concerned with any significant difference between intermediate and advanced EL learners' RL in externalizing their inner thought to an electronically-presented social event. Drawing on the reported results, the

difference between the advanced and intermediate groups was observable at their RL in giving blame and punishment scores to Sara's action. The difference in L2 proficiency might be the cause of RL distinction between the two groups. As Bakhoda and Shabani (2016) claimed, learners with larger zone of proximal development and zone of actual development required a shorter amount of processing time to arrive at the correct answer. Although the two groups of learners were asked to determine the appropriate blame and punishment scores to Sara's action based upon the statements (and there was not any correct answer), the advanced learners spent shorter amount of time to set the scores. Therefore, this study supports Rai et al.'s (2011) claim that once L2 proficiency increases the information processing becomes less demanding for learners. Besides, the result of this study corroborates McNamara and Maglianio's (2009) view on mental representation of a text and its load on cognitive information processing.

The carefully organized, fine-tuned and systematic presentation of a typical social event in a calibrated fashion could act as a guiding scheme to help the learners construct their own idiosyncratic conception of the social event. Any haphazard selection and presentation of instructional materials (e.g., books, songs, videos, etc.) to the L2 learners would preclude a learner from personalizing and performing like the presented characters to create their own meaning(s).

Conclusion

This study sheds light on the dynamic nature of L2 meaning-making, showing how learners personalize social messages through internalization and externalization processes. The differences in blame, punishment scores, and response latencies between intermediate and advanced learners highlight the personalized and non-linear nature of L2 learning. These findings suggest that language instructors should consider learners' cognitive and emotional responses when designing tasks and selecting materials, promoting deeper reflection and personal meaning-making.

The study also underscores the importance of complex, contextually rich tasks in facilitating L2 learners' internalization of social messages. The use of semiotic scoring systems offers a novel way to capture cognitive processes, showing potential for more personalized L2 pedagogy. Instructors should aim to create learning environments that engage learners in active interpretation, fostering cultural competence and critical thinking.

One limitation of this study is the relatively small sample size, with only 20 participants in each proficiency group, which may limit the generalizability of the findings to broader L2 learner populations. Additionally, the study focused on learners from a specific cultural and linguistic background (Iranian EL learners), which may influence the internalization and externalization processes differently from learners in other cultural contexts. Another limitation is the exclusive use of computerized assessments, which may not fully capture the complexities of face-to-face interactions or the full spectrum of mediational tools available in diverse learning environments. Future research could address these limitations by incorporating larger, more diverse samples and a wider range of assessment methods.

Future research could explore factors such as cultural background and emotional intelligence, deepening our understanding of how learners internalize social messages.

Additionally, the continued exploration of dynamic assessment tools can help optimize L2 learning by catering to individual learners' cognitive needs.

In sum, this study contributes to sociocultural theory in L2 learning by emphasizing the importance of personalized meaning-making and advocating for teaching approaches that prioritize individual engagement with language and content.

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