

Original paper

L2 Motivation Theories from Metatheoretical Perspective: A Critical Review of CDST, L2 Motivational Self-System, AT, DMC, and TEA¹

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This paper reviews five recent theories of second language acquisition (SLA) and cultural-historical psychology, all of which have been utilized in the field of second language (L2) motivation research. I investigate the role that “metatheory” in the Complex Dynamic Systems Theory (CDST) plays in other reviewed theories to determine the extent to which CDST can be applied to the study of L2 motivation as a metatheory. The particular focus is on how CDST can be applied as a metatheory in the Trajectory Equifinality Approach (TEA), the most recent theory in cultural-historical psychology, which is increasingly being deployed in the field of L2 motivation. Finally, I discuss core issues arising from the broadness of the metatheory for L2 motivation studies.

1. Introduction

With regard to the relationship between second language (L2) motivation and second language acquisition (SLA), one of the main areas of individual differences is motivation, which “has a long history that pre-dates the beginning of SLA as a field of enquiry” (Ellis, 2008, p. 643). When we learn and acquire a new language, the degree of proficiency that individuals aim to achieve can vary greatly depending on their goals and the amount of time and effort they are willing to invest in the learning process. The process can significantly impact a learner’s motivation, persistence, and overall success in acquiring the language. Therefore, SLA can be defined as “a motivational pursuit” (Papi & Hiver, 2022, p. 113).

Having reviewed the SLA-L2 motivation relationship, let me first take you on a short journey of L2 motivation research by asking this: What are the most recent landscapes of this research field, and how have L2 motivation researchers responded and behaved toward them?

Research efforts to better understand L2 motivation are traditionally the most developed areas of language learning psychology (Boo et al., 2015; Dörnyei & Ryan, 2015). The past two decades (2000–present) have been termed the *process-oriented period* in L2 motivation studies (Dörnyei & Ryan, 2015, p. 74), which is a period characterized by a large amount of relatively diverse research. These studies have focused on the changes to and dynamism of motivation, self-regulation, the imaginary (possible) selves, and the emergence of individual

motivation in sociocultural contexts (Mahmoodi & Yousefi, 2022). We can summarize the overall trend in three distinctive fashions. First, to reframe L2 motivation studies, Dörnyei (2005, 2009) proposed a new conceptualization of language learning motivation called the L2 Motivational Self System (L2MSS), a broad construct centered on the future vision and image of people in the self-concept system (Mahmoodi & Yousefi, 2022). As Ushioda (2020a) puts it, the globalization of English in the 21st century has contributed to an essential rethinking of L2 motivations from the perspective of the inner self. L2MSS initially provided a comprehensive paradigm for incorporating earlier theories (Sugita McEown et al., 2014), and this integration trend is continuing today (Boo et al., 2015).

Second, regarding research methodology, the research trend seems to have shifted from a quantitative approach to a more qualitative one, as clarified by Boo et al. (2015) and by Mahmoodi and Yousefi (2022). The former study reported that, between 2005 and 2014, 53% (178/335) of the published literature took the quantitative approach and 21% (71/335) took the qualitative approach. Also, there was a significant increase in qualitative studies between these years (from two to 21), as well as in mixed-method studies (from four to 23). These results resonate with the consistent calls for research tenets such as ‘person-in-context’ (Ushioda, 2009), where “retrospective participant interviews, narratives, diaries, or other forms of reconstruction” (p. 222) are expected in the methodology. In the latter study, between 2010 and 2019, Mahmoodi and Yousefi (2022) reported that 51% (48/94) of research on L2 motivation could be classified as quantitative, followed by 23% (22/94) for mixed methods and 22% (21/94) for the qualitative approach. Dörnyei (2007) criticized the mixed-method approach, claiming that “the reasoning or logic behind such an assumption is not always as readily expressed as is the sentiment itself” (p. 46). However, this “paradigm shift” (Boo et al., 2015, p. 153) toward qualitative and mixed-method research is primarily linked to the new conceptual framework or alternative framework that characterizes the field of L2 motivation research in the first decades of the 21st century. These newer frameworks include the L2MSS mentioned above, Vygotskian’s Sociocultural Theory (SCT), the Activity Theory (AT), and the Complex Dynamic Systems Theory (CDST) (Ushioda, 2020b).

Finally, as the methodological climate in L2 motivation research revealed itself to be both dynamic and adaptive, it quickly became apparent that the process model based on cause-and-effect relationships did not provide a realistic description of the motivational phenomenon observed in actual situations. Under this circumstance, CDST attracted immense attention from L2 motivation researchers, and it was not long before they elaborated upon CDST as a solid theoretical foundation for their research. It is worth mentioning here that CDST is a metatheory, i.e., a conceptual framework that guides the development of principles for investigating open, adaptable, and emergent systems (Zheng et al., 2020). We will revisit this concept in detail in Section 2.

The following section introduces the five most recent theories of SLA and cultural-historical psychology to clarify their theoretical traits and current applicability to L2 motivation studies.

2. Five theories in L2 motivation research

2.1. Complex Dynamic Systems Theory (CDST)

CDST is no longer limited to the natural sciences (physics, mathematics, social sciences, etc.) and is now widely utilized in SLA. The main traits of CDST can be defined in the following fashion (Hiver, 2015; Larsen-Freeman & Cameron, 2008; Morrison, 2008):

- 1) System change: CDST addresses dynamic systems that change over time.
- 2) Non-linearity: In CDST, change is addressed in a holistic and non-linear way rather than using a cause-and-effect approach. This means that it considers all the interactions within a system rather than breaking it down into separate components to analyze them individually.
- 3) Heterogeneity: Complex dynamic systems (CDS) typically refer to systems that consist of many different interacting agents.
- 4) Self-organization and emergence: CDS can lead to the emergence of new structures or patterns that were not present in the system before because of the phase shift. This shift can be a form of self-organization, whereby the system spontaneously reorganizes itself into a new pattern of behavior.
- 5) Open and adaptive: CDS can respond to changes in the environment and evolve over time. These systems are not isolated but rather are open, which is what allows them to interact with the environment and adapt to it.
- 6) Attractor state/attractor basin: Some CDS may exhibit a tendency to gravitate towards equilibrium, in which a system will remain stable unless certain strong factors come into play. This condition is called the attractor state and contrasts with the attractor basin, which is the set of initial conditions for which a system will converge to a particular attractor state.

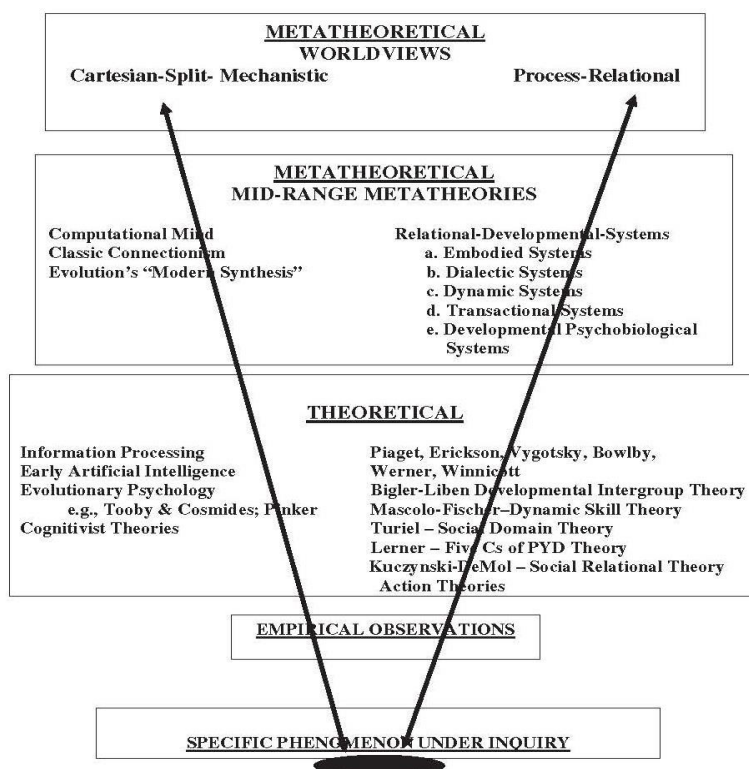
Dörnyei, MacIntyre, and Henry's (2015) Motivational Dynamics anthology placed the CDST map of L2 motivation firmly in the research landscape (Hiver & Papi, 2019). A less examined area of L2 motivation, although its importance is certainly acknowledged, is L2 teacher motivation (Boo et al., 2015; Mahmoodi & Yousefi, 2022). Even in this area, CDST can be "a profitable but essentially open-ended frame of thinking about language teacher motivation, inviting multiple and varied theoretical iterations" (Kubanyiova, 2019, p. 395). In this context, promising evidence of L2 teachers' complex and dynamic trajectories can be accumulated (Kimura, 2014, 2022a; Sampson, 2016, 2022).

CDST is a metatheory (Hiver & Al-Hoorie, 2020; Larsen-Freeman, 2017). In other words, it is a higher-order theory with a scope "broader than any particular theory" (Overton, 2015, p. 166). Overton (2015) further elaborated that in the highest metatheoretical plane, called *paradigms*, two contrasting views are situated: the *Cartesian-Split-Mechanistic* and the *Process-Relational* metatheoretical worldviews. CDST (as *Dynamic Systems*) is located underneath the *Process-Relational* worldview as one of the "Relational-Developmental-Systems" (p. 168), a group of metatheories committed to an ontology of change and a relational holism (Fig. 1).

It is indeed this relational trait of CDST (Hiver & Larsen-Freeman, 2020) that underlies its definition as a metatheory. Later, we will revisit this point through a theoretical comparison of CDST and the Trajectory Equifinality Approach (TEA).

Figure 1

Nested Levels of Scientific Discourse (Overton, 2015, p. 168, reused with permission.)



Note. The position of CDST (as Dynamic Systems in this figure) is in the METATHEORETICAL plane on the side of the Process-Relational worldview above the THEORETICAL plane, which includes individual subordinate theories.

2.2. L2 Motivational Self System (L2MSS)

The basis of Dörnyei's (2005, 2009) L2MSS is derived from the possible selves theory (Markus & Nurius, 1986), the self-discrepancy theory (Higgins, 1987), and the socio-educational model of motivation (Gardner, 2019). It is essentially based on the presumption that people's perceptions of future self-expression are essential in creating energy in the present. The components of L2MSS are as follows. *Ideal L2 Self* is the construct of a desirable image for the L2 user, namely, the ideal image of him or herself in the future. *Ought-to L2 Self* expresses the attributes believed to be essential for meeting expectations and avoiding possible negative results in the learning process of L2. Lastly, *L2 Learning Experiences* is the component that focuses on the learning

experience and covers “executive motives” (Dörnyei & Ryan, 2015, p. 88) in the immediate learning environment, such as “the impact of the teacher, the curriculum, the peer group, and the experience of success” (Dörnyei, 2009, p. 29). Since its first inception, many empirical studies have tested and validated this model in various EFL/ESL contexts in different countries. Thus, as mentioned earlier, L2MSS is today the most powerful analytical framework that serves as a foundation body for L2 motivation research. However, to date, most of the empirical studies have reported mixed or conflicting results, making the overall impact of L2 motivation and its relationship to certain contextual factors and results unclear (Yousefi & Mahmoodi, 2022).

L2MSS has achieved fruitful results in terms of research benefits and pedagogical implications. One such outstanding example in the field of teachers’ L2 motivation and teacher cognition is Kubanyiova’s theory of language teachers’ possible selves (Kubanyiova, 2009, 2012, 2015). Utilizing L2MSS as a basis, she proposed the Possible Language Teacher Self, which comprises the Ideal Language Teacher Self and the Ought-to Language Teacher Self and applied these concepts to her longitudinal qualitative data analysis. These new concepts underpin the understanding of L2 teachers’ motivation and cognition, which can lead to better teaching of L2 classroom practices.

2.3. Sociocultural Theory (SCT) / Activity Theory (AT)

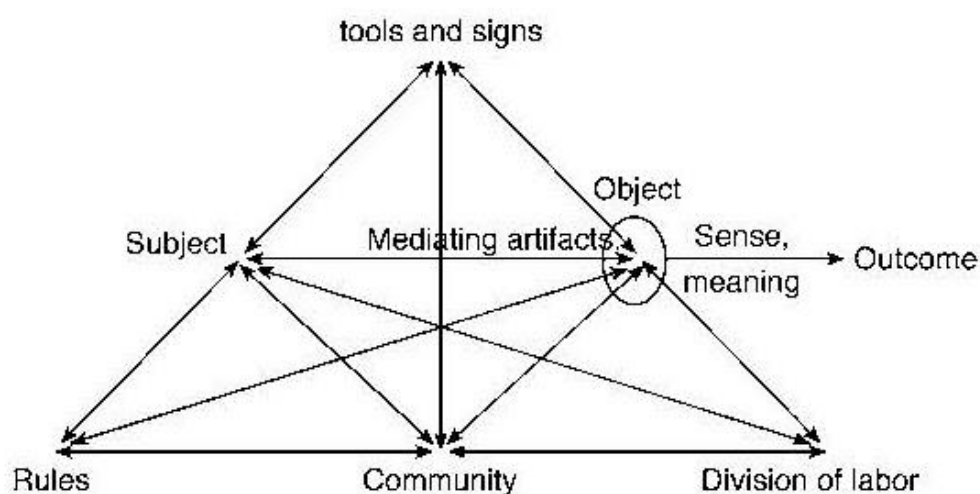
SCT and AT were both proposed by Vygotsky (1978) in the 1920s and early 1930s (Engeström, 2001). AT was further developed by Vygotsky’s colleague and protégé Alexei Leont’ev (Leont’ev, 1978, 1981) based on the mediation theory of learning. Theorist Yrjö Engeström came up with the idea of activity system analysis to explain the social dimensions of human activity (e.g., Engeström, 1999). When applying AT to data analysis in the framework of AT, the activity system, i.e., contextualized human activity, is considered the basic unit of analysis. In the activity system, fundamental relations involve human subjects (Subject), and those relations intend to convert objects (Object) to achieve ultimate results by means of mediation. The mediation occurs through various culturally/historically developed artifacts such as tools, rules, and division of labor (Engeström, 2001) (Fig. 2). The advantage of AT analysis is that it visualizes *contradictions*, i.e., the tensions between sub-AT systems, where some conflicts can be observed among subjects and other cultural-historical artifacts. These contradictory analyses are particularly relevant when it comes to resolving the inconsistencies between the original design and concepts of learning activities and the actual application (Antoniadou, 2011). At present, AT has evolved up to its fourth generation, in which “[d]ialogue, trust and collaboration need to be built among large numbers of diverse activity systems and their actors, crossing professional, functional and administrative boundaries both horizontally and vertically” (Engeström & Sannino, 2021, p. 19). In terms of the application of AT to SLA, the relevant areas include L2 writing (Fujioka, 2014; Lei, 2008; Li, 2013; Nelson & Kim, 2001; Yang et al., 2004), peer-peer or student-teacher response (Antoniadou, 2011; Zhu & Mitchell, 2012), and dynamic assessment (Sagre et al., 2022). These mainly utilize the second-generation AT.

Tae-Young Kim and his colleagues have extensively investigated L2 motivation from the AT perspective

(Kim & Kim, 2021; Kim, 2005, 2011; Kim & Kim, 2022). For example, Kim and Kim’s (2022) qualitative study explored the emotional labor of two novice junior high school EFL teachers using AT as an analysis framework. Their findings revealed some crucial contradictions, which demonstrates the benefits of the AT framework. In Section 3, we will revisit this approach with L2 motivation and CDST.

Figure 2

The Structure of a Human Activity System (Engeström, 2001, p. 135, reused with permission from the author.)



Note. This diagram shows the mediated relationships between human subjects (Subject), objects (Object), and various surrounding culturally/historically mediated tools.

2.4. Directed Motivational Currents (DMC)

Directed motivational currents (DMCs), which refer to surges of motivational energy, compose the most recent L2 motivation theory proposed by Dörnyei and his colleagues (Dörnyei et al., 2016; Dörnyei et al., 2014; Muir, 2020). Rooted in Dörnyei’s theory of vision in L2 learning (Dörnyei & Chan, 2013; Dörnyei & Kubanyiova, 2014), these surges are a phenomenon of intense and long-lasting motivation in the pursuit of desirable personal goals and visions. There are five main traits of a DMC (Muir, 2020, pp. 57–85), as detailed below.

1) Goal/vision-oriented nature: A DMC always has a clear end goal consisting of *self-concordant goals* and *proximal sub-goals*. The *self-concordant goals* include important personal aspirations, such as those related to education, career, or employment, the building of intimate personal relationships, and contributions to society. These goals are generated autonomously and fully integrated, which distinguishes DMC-experienced learners from mere highly motivated learners (Henry, 2019). As for *proximal sub-goals*, they play a crucial role in

guiding people toward distal goals, as such goals are often too distant or general to motivate specific actions. Thus, when these sub-goals are appropriately set, durable forms of motivation can occur, while self-concordant goals can function as steering mechanisms for setting sub-objectives, which supports the overall goal and makes it more robust (Dörnyei et al., 2016).

2) Clearly defined launch: A DMC always has a clear starting point once action towards a goal is triggered. In this stage, three elements are vital for determining whether a DMC can indeed emerge and continue for a long time.

a) *Initial conditions* indicate the extent to which an L2 learner is ready for the DMC's launch. This element includes a *clear set of goals* that are cohesive and show a clear direction for the learner to pursue, and a *sense of ownership and control* indicating the extent to which the L2 learner can sense a feeling of capability in terms of the process and its outcome.

b) *Triggering stimuli* refer to the various igniting stimuli for a DMC, such as new relationships with people who have similar goals, the opportunity to meet and converse with significant people, or exposure to influential role models (Muir, 2020, p. 65).

c) *Continual re-triggering* is the mechanism that makes a DMC's long journey possible. A strong surge of the initial DMC might be observed as a single burst of initial energy, but even so, it is continuously renewed through many motivational impulses.

3) Structure: DMCs have distinctive structures to sustain motivational currents. Here, three key concepts come into play: a) *behavioral routines, motivational autopilot, and nonconscious self-regulation*, b) *subgoals and perceptions of progress*, and c) *affirmative feedback*. For example, during an ongoing DMC, getting up early and staying up late to study is a type of motivational autopilot that individuals usually perform without conscious awareness of effort (Muir, 2020, p. 70). It is also the case that achieving self-concordant goals can make people feel happier through the expenditure of effort if they choose the right goal and do well with it (Henry, 2019). Feedback plays another crucial role in the context of DMCs, particularly if it is the affirmative type. Affirmative feedback is vital in encouraging learners to have a positive perception of progress by accentuating the differences between their initial and current performance levels.

4) Positive emotional loading, i.e., a unique sense of joy and satisfaction. People tend to feel uniquely joyful and satisfied when they experience DMCs. Such positive emotional loading consists of the following core traits.

a) *Eudaimonia*: This refers to "deep-seated feelings of well-being and fulfillment" (Henry, 2019, p. 150) that occur even when carrying out the most prosaic activities. This unique experience of inner happiness that encompasses everything was described by Dörnyei et al. (2016) in a quote from an imaginary Ph.D. student 'Helen' who says that "it is kind of...a more subdued kind of happiness....it just fuels you to move on and on and on..." (p. 105).

b) *Dedicated effort in the pursuit of excellence*: Once they are experiencing DMC, people dedicate every

effort in pursuit of their longer-term goals, and in such a context, clear distinctions can be made between eudaimonic well-being and pleasure and the more temporary highs associated with hedonic pleasure (Dörnyei et al., 2016, p. 107). As they engage in goal-directed activities, people can feel a sense of eudaimonia even during the most mundane, boring activities, such as doing seemingly endless grammar exercises or memorizing long lists of vocabulary (Dörnyei et al., 2016, p. 109).

c) *Authenticity*: Once people are caught up in a DMC, they experience a eudaimonic feeling of well-being, that is, a deep and enduring sense of personal contentment. In such a situation, they often feel like their “true or real self” (Lenton et al., 2016, p. 64). This sense of true/real self, or authenticity, exists over a continued period during a DMC’s lasting peak moment. To achieve this association, it is crucial for learners to have a solidly established ideal vision of themselves because, as Lenton et al. (2013) demonstrated, authenticity and the ideal self are strongly overlapped. This evidence supports the findings of Tsunoda (2018), who showed that L2 DMCs provide a clear and stable path to partially fulfilling the ideal self.

5) Clearly defined ending: When the final goal is attained, the potency of many DMCs will start to wane and sometimes abruptly come to an end. Two mechanisms function in this final stage: a) *the disappearance of the protective shield of visionary single-mindedness* and b) *effort as a subjective experience*.

In a DMC, the effort to make it to the final goal is expended unconsciously, thanks to the DMC structure mentioned above. However, once the goal is attained and there is no longer a need to maintain this structure, no mechanism is available to protect *visionary single-mindedness*, which is the mechanism that maintains people’s focus on the objective goal and filters out other competing or distracting goals. Likewise, while rapid and effortless progression toward the final goal is essentially guaranteed in a DMC, this ceases as the DMC begins to disperse, and the same task will require a more strenuous cognitive effort.

Although DMC studies are still in the early stages, they are supported by a growing amount of research. These include confirmation studies investigating the basis of DMC theory (Dörnyei et al., 2016; Dörnyei et al., 2014; Henry et al., 2015; Safdari & Maftoon, 2017; Zarrinabadi & Tavakoli, 2017), quantitative and qualitative investigation of DMC among EFL learners with particular language backgrounds (Ghanizadeh & Jahedizadeh, 2017; Li et al., 2021), empirical studies exploring the relationship between DMC and related SLA areas of interest (such as autonomy, WTC, and self-efficacy) (Pietluch, 2018; Zarrinabadi et al., 2019), studies validating the relevance of the DMC framework qualitatively (Muir, 2020; Xodabande & Babaii, 2021), and finally, an investigation of the listening DMCs of Chinese EFL students from the CDST perspective (Chang & Zhang, 2020).

2.5. Trajectory Equifinality Approach (TEA)

Before examining TEA in relation to L2 motivation, I will describe the theoretical background of cultural psychology by introducing Sato (2011) to clarify how TEA is utilized in L2 motivation. History and culture are embedded in the actions people take in everyday life. Observing people’s actions without interpreting their

historical and cultural aspects may result in missing the crucial whole. Take the example of a young Korean girl who had once received a small amount of regular pocket money from her mother, as many of her friends had also started receiving, but whose mother eventually refused to give her the allowance because of the girl's poor management of it. The girl asked her mother to resume the allowance, but the mother only promised to do so in the future, not immediately. As Sato (2011) tells it, unless this story is observed through the lens of cultural psychology, we miss the whole picture of this Korean girl and her pocket money events: namely, the difference between the first time and the second petition. The first was her simple desire to have what her friends had, but the second petition to her mother was quite different. Specifically, she wanted to resume receiving her allowance because of the Korean culture familiar among young children: they treat each other using the pocket money received from their parents. These actions are “embedded in their living situations...[a]nd these situations are construed historically and culturally” (Sato, 2011, p. 123).

Sato's (2011) insightful view demonstrates that observing the phenomenological development of humans, communities, and/or societies from a cultural psychological perspective offers us holistic and multifaceted pictures of the development. TEA is a cultural psychology theory that encompasses societal and cultural contexts in the trajectories of phenomenological development without overlooking time.

TEA is a conglomerate of three main components: the *Trajectory Equifinality Method (TEM)*, *Historically Structured Inviting (HSI)*, and the *Three-layer Model of Genesis (TLMG)*. First, TEM plays a core role as the engine or “flagship” (Sato, 2015, p. 53) for the entire TEA. The crucial tenet is that living organisms are essentially open systems. Within such systems, Bertalanffy (1968) introduced the notion of “equifinality,” stating that in an open system, “[t]he same final state may be reached from different initial conditions and in different ways” (p. 40). Sato et al. (2009) and Sato and Valsiner (2010) elaborated on this to develop a minimal unit analysis of phenomenological development embedded in history and culture. It tells us that in an open system with time being irreversible, a minimum unit of TEM rises from a *Bifurcation Point (BFP)*, where the subjects of analysis take different individual trajectories based on a crucial decision, and then moves to an *Equifinality Point (EFP)* at which individual trajectories may converge (Fig. 3.1). Defining EFP is essential in TEM because it can act as a convergent point in an open system for a theoretical rationale, and it also can play a role as an insightful viewpoint through which researchers can identify analytical clues (Sato, 2015, p. 54). As a complementary set of EFP, *Polarized EFP (P-EFP)*, an imaginary alternative, can be utilized to neutralize the implicit value system of researchers (Sato et al., 2009, p. 228) (see Fig. 3.2 with dotted lined boxes). P-EFP is an abductive hypothesis, neither inductive nor deductive. For example, if the theme of an EFP is *Being independent*, that of a P-EFP is perhaps *Not being independent*. However, as the analysis goes deeper, it may change to *Against intervention from parents* or *Continuing to pursue own identity* (Yasuda, 2015). Figure 3.2 shows three P-EFPs that have been set, toward which dotted-lined trajectories are directed. As shown here, P-EFPs can play a pivotal role in making other possible trajectory routes visible, even though they are not chosen in reality. By setting these P-EFPs, the value of the EFP may become more relative (Yasuda, 2015). The

Obligatory Passage Point (OPP) is introduced as a phase or event experienced inevitably by the subjects of analysis. For example, in the case of humans, starting compulsory education (institutional OPP), getting baptized (customary OPP), or experiencing natural disasters (resultant OPP) are appropriate. Such OPPs are firmly under the influence of social pressures dictating human actions. Also, to the same extent, at the BFP, where humans make crucial trajectory choices, the inhibition of social pressure is still applied, but promotional social pressure towards EFP can also be applied at the same time. The former is called *Social Direction (SD)*, i.e., the inhibiting force toward EFP, and the latter is *Social Guidance (SG)*, the promotional, assistive force toward EFP (Yasuda, 2015) (see the point in Fig. 3.2 where the SD and SG at each BFP are depicted as if they were contending against each other).

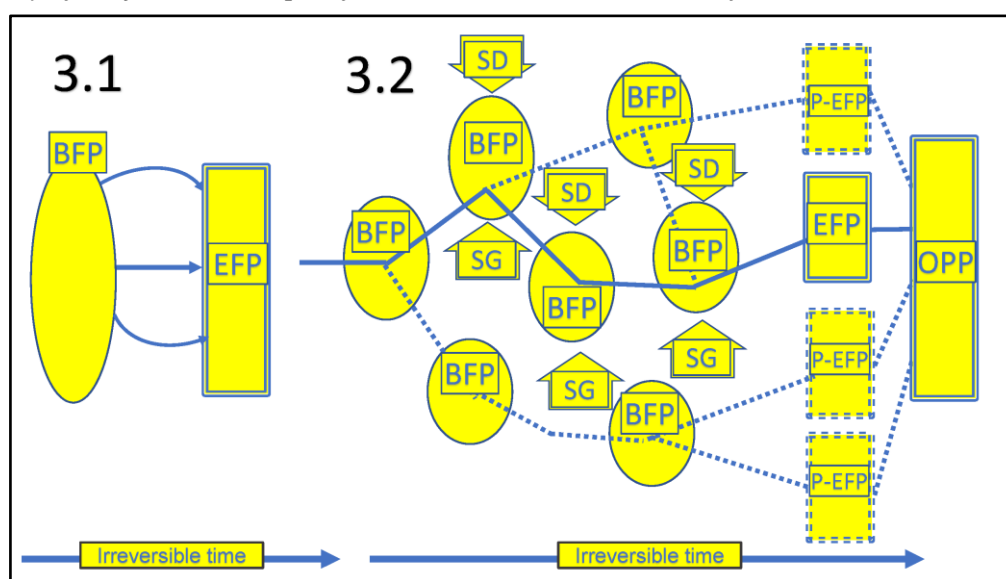
The second component of TEA, HSI, was conceptualized as an alternative sampling method taking a cultural-historical approach. In HSI, invitation of participants is performed by considering the historical trajectories of the participants. This approach is quite the opposite of traditional sampling methods (e.g., those using experimental and control groups in a laboratory setting), and thus, replacing the reliance on the notion of random sampling enables us to compare the individual’s trajectory and life stages to the current state. To put it simply, researchers select people “who experienced an Equifinality Point while arriving there through very different life course trajectories” (Sato et al., 2014, p. 97), and then by selecting those with similar experiences and inviting them to hear their life trajectories, it becomes possible to capture the extent to which those similarities are similar or dissimilar and thus make the research meaningful (Arakawa et al., 2012).

Figure 3.1

Minimum Unit of TEM (adapted from Sato 2015, with modification)

Figure 3.2

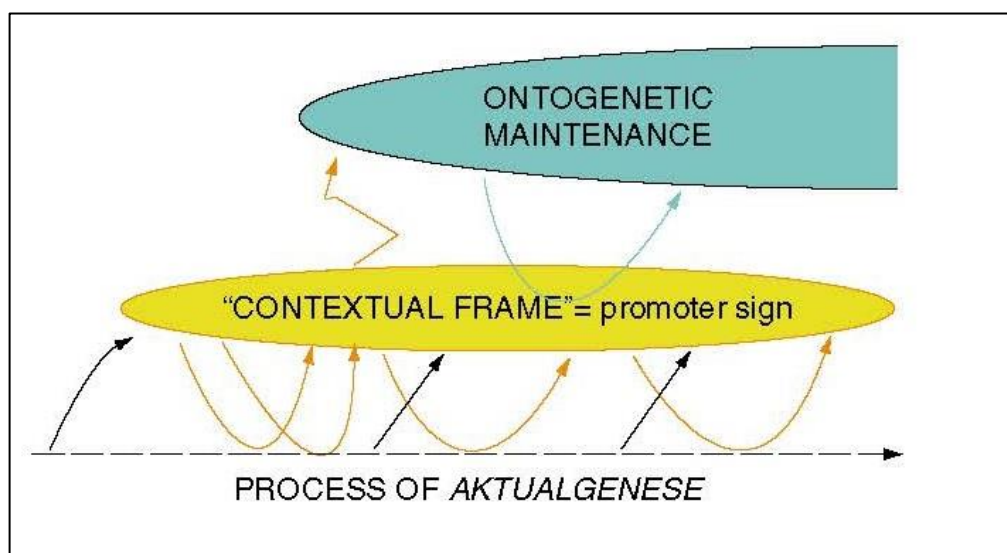
Multilinearity of Trajectories (adapted from Sato 2009, 2015, with modification)



Finally, TLMG clarifies mechanisms for determining how humans form their values at a BFP (Sato et al., 2014, p. 98) when they are facing different trajectory options. The lowest level, *Microgenesis*, also called the *process of Aktualgenese* (microgenesis in English), represents the immediate living experiences of humans, where new events are constantly being faced and various stimuli are received, some of which may be irrelevant while others have significant meaning. At the second level of *Mesogenesis*, some of these meaningful experiences are stabilized using semiotic devices, or meaning-making processes, leading to the creation of signs assisted by “the collective cultural canalization” (Valsiner, 2007, p. 302). The *Methogenetic* level comprises relatively routine situated activity settings such as “praying, or going to school, or taking a shower or bath” (Valsiner, 2007, p. 302). Thus, at the *Mesogenetic* level, changes that occurred at the *Microgenetic* level are either consolidated to be taken as a new invention or are utilized as regulatory agents of the microgenetic process. The highest *Ontogenesis* level is the most enduring aspect of human or cultural life. It is said that only some chosen experiences reach this highest level and become a solid, meaningful structure, thus creating “a kind of value system of person” (Sato et al., 2014, p. 98) (Fig. 4). Therefore, when facing alternative trajectory pathways at a BFP, humans’ decision-making mechanism can be explained by TLMG, as their decisions are based on their unique value system. In other words, when humans choose one from among several candidate paths at a BFP, their decision is made based on the value system formed at the *Ontogenetic* level.

Figure 4

The Scheme of Three Layers Model of Genesis (TLMG) (Sato et al., 2009, p. 236, reused with permission.)



Note. This figure shows the relationship among the three layers of genesis: *Microgenetic* (the lowest), *Mesogenetic* (in the middle), and *Ontogenetic* (the uppermost). At the *Microgenetic* level, humans experience immediate living stimuli all the time, whereas at the *Mesogenetic* level, where semiotic

stabilization is achieved, some stimuli (not all) are converted into signs. Finally, at the *Ontogenetic* level, these signs are transformed into a relatively stable meaning structure.

TEA first emerged in 2004 in the field of cultural psychology. Although still in its early stages, promising results have been reported among the empirical studies in SLA (Aoyama & Yamamoto, 2021; Kitade, 2015; Koyama, 2021; Mitsugi, 2019; Tsuchiya, 2018; Yashima & Arano, 2015). For example, Koyama (2021) illustrated the longitudinal changes in the L2 motivation to Japanese language learning of three Bangladesh IT workers. These participants, who were the subject of HSI, had similar historical experiences of life trajectories in which the author set ‘maintaining positive L2 motivation’ as their EFP. Among the several common OPPs and unique BFPs of each participant, Koyama (2021) drew meticulous TEM figures and interpreted three salient factors that seem to have affected the L2 learners’ motivational changes: 1) participants’ perception of the need for the Japanese language, 2) that of the difficulty of learning Japanese, and 3) to what extent the classroom procedures they had to follow matched their own learning styles. These findings are methodologically and pedagogically beneficial because they are revealed in socially/culturally embedded contexts using TEA’s various theoretical apparatus described in the earlier part of this section.

3. CDST as a Meta-Theory: Applications to empirical studies

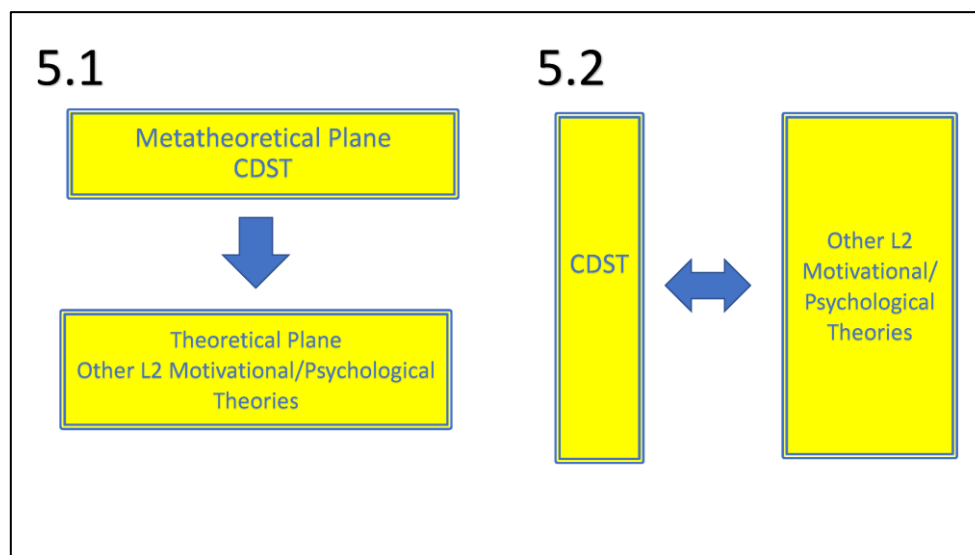
In this section, I will examine CDST in terms of all five theories presented in the previous section, whether or how it may be able to function as a metatheory in empirical studies on L2 motivation. For the sake of explicitness, I will review empirical studies related to CDST in terms of the extent to which they utilize CDST as a metatheory and the ways in which they do it, in two fashions. The first is a vertical review, as CDST is a metatheory positioned on a higher order than other theories, to capture the phenomenological data entities as complex dynamic phenomena (Fig. 5.1). The second is a horizontal review, in which I compare CDST with other theories to determine which theory is best able to play a metatheoretical role (Fig. 5.2).

3.1. Position of CDST on the metatheoretical plane

Many examples of the first type of review (Fig. 5.1) can be found in Dörnyei et al.’s (2015) anthology, which extensively discusses the theory of dynamic systems in motivational research and also includes studies that apply CDST in both quantitative and qualitative paradigms. Let us take a closer look at two examples of L2MSS studies. One features metatheory applications with and without CDST. The other investigates two learners’ ideal L2 self in the context of motivational dynamics, where self-images are co-adapted through interactions with complex systems of internal and concomitant processes.

Figure 5.

Two Approaches of Metatheoretical Comparison



The first example compares the studies of Csizér and Kormos (2009) and Piniel and Csizér (2015), both of which addressed L2MSS from a quantitative perspective but with quite different attitudes. For example, in the former study, the authors utilized the structural equation modeling (SEM) approach to investigate the relationship among three components of L2MSS, namely, *ideal L2 self*, *ought-to L2 self*, and *L2 learning experience*. In particular, based on their previous study on Hungarian learners' L2 motivation, the authors hypothesized that parental encouragement could contribute to L2 learning experiences, knowledge orientation, and ought-to L2 selves. The SEM results of a 65-item Likert-scale questionnaire administered to 279 L2 learners of secondary- and tertiary-level school participants demonstrated that parental influence among young L2 learners and their ought-to L2 self was very strong.

The latter study addressed learners' individual differences (IDs) by focusing on their writing anxiety, self-efficacy, and motivation as an ID amalgam. The key difference from the former study is that the authors selected a longitudinal mixed-method approach, with CDST as a template for interpretations (thus, as a metatheory) for investigating 21 university L2 learners' trajectories on an ID amalgam for 14 weeks. The diverse instruments included a five-point Likert-scale questionnaire (including 15 items on L2MSS), grades on academic writing tests, and descriptive essays at the end of the semester. In addition, the authors used Latent Growth Curve Modelling (LGM), one of the methods Hiver and Al-Hoorie (2020) proposed as a longitudinal, extensional version of SEM, which is framed in CDST terms (Fig. 6).

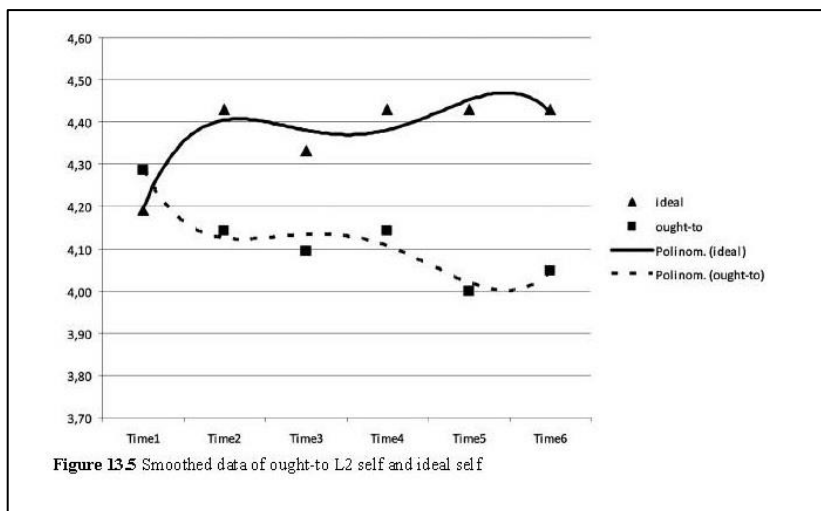
Another notable example of L2MSS from the CDST perspective is found in the research by Nitta and Baba (2015). In this study, L2 learners' ideal L2 self in an EFL classroom changed via a repeated commitment to L2 learning tasks. To put it more precisely, the authors investigated how EFL learners' ideal L2 self and task-

specific motivation would take a dynamic trajectory, i.e., whether they would *interact* or *co-adapt* over one year. Utilizing the three critical self-regulatory indices (goal-setting, self-observation, and self-evaluation) with “phase transition” (Baba & Nitta, 2014) as a basis for the analysis of two particular participants, the authors extracted written composition sections and reviewed their ideal L2 self in the composition. They then confirmed the two participants’ “complex co-adaptive processes between the ideal L2 self and task-specific motivation” (Nitta & Baba, 2015, p. 392). Although not mentioned explicitly, this study also investigated EFL learners’ complex adaptation of L2 ideal self in CDST as a metatheory.

The next example is Chang and Zhang’s (2020) longitudinal quantitative research in the idiodynamic approach, which utilized the DCM questionnaire to scale five EFL learners’ listening comprehension over three years. The authors used the AnionVariable Tester (Hiver & Al-Hoorie, 2020, p. 229) to generate idiodynamic patterns of moment-to-moment changes in listening comprehension. Distinctive patterns of trajectories were divided to investigate the inter-individual variabilities of three higher-level and two lower-level learners. As Hiver and Al-Hoorie (2020) consider the idiodynamic method to be a CDST approach, it is fair to say that in this study, CDST played a metatheoretical role in uncovering the learners’ motivational fluctuations over a long period of time.

Figure 6

Smoothed Data of Ought-to L2 Self and Ideal L2 Self (Piniel and Csizér, 2015, p. 182, reused with permission.) ²



3.2. Horizontal comparisons of theories as a metatheory

The relationship between CDST and two other theories (Fig. 5.2), namely, AT and TEA, suggests that whether CDST can play a broader metatheoretical role than these two theories is uncertain. For example, Kim (2017) considered CDST to be an alternative approach (Atkinson, 2011), arguing the demotivation from the

CDST and SCT perspectives, not hierarchically:

In CDS[T], a phase shift from a motivated, attractor state to a demotivated, repeller state is implied, whereas from an SCT/AT perspective (Kim, 2010a, 2010b),...demotivation is seen as a gradual process of disintegration from motivation to simple motive, whereby learner goals and participation are all dissociated from motive. (Kim, 2017, p. 34)

Similarly, there are no empirical studies on L2 motivation from the TEA perspective in which CDST is addressed as a metatheory. For example, Yashima and Arano (2015) utilized TLMG, one of TEA's crucial components, to discriminate participants' interview data and determine whether they could be categorized in the microgenesis, mesogenesis, or ontogenesis levels. Here, they utilized a part of TEA's theoretical constructs, but not TEA per se, to show how participants' motivational fluctuations and behavioral choices took diverse trajectories.

Under this circumstance, no methodological approach is available for exploring metatheoretical relationships among multiple theories. Kimura (2022b) attempted to compare the theoretical *broadness* between CDST and TEA by analyzing participants' qualitative data using the computer-assisted qualitative analysis software (CAQDAS) NVivo (QSR International Pty Ltd., 2022). In Kimura (2022b), I demonstrated CDST's theoretical potential to capture a "broader" (Overton, 2015, p. 166) concept of participants' L2 motivation in attractor states than their L2 motivation described through life trajectories in TEA. In CDST studies, focusing on attractor states is a promising approach to capturing emergent outcomes (Hiver & Al-Hoorie, 2020). It is also the case, as Yashima and Arano's (2015) selection of TLMG shows, that in TEA, bifurcation points (BFPs) are related to TLMG (Sato et al., 2014) in crucial fashion, because it is through BFPs that "a kind of value system of person" (Sato et al., 2014, p. 98) is created. Using the coding method developed by Miles et al. (2020) as a basis, in Kimura (2022b), I completed a meticulous coding process for six focus students' semi-structured interviews from 2017 to 2020 and compared the total number of attractor state references to those of BFP references. The results were partially consistent. Of six, five focus students' attractor state references were more significant in number than those of BFP references, thereby indicating that from the attractor state view, these participants showed a broader connection of their L2 motivation with the explicit reason for their positive L2 motivation, for example, in the in-class activities, their extra-curricular activities, and the roots of one participant's ancestors. In Kimura (2022b), I concluded that CDST possibly captures a broader range of considerations that can internalize TEA entirely, but at the same time suggested some limitations, which we will examine more closely in the following section.

4. Discussion, limitations, and future research perspectives

As clarified in the previous section, the metatheoretical relationship between CDST and cultural-historical

psychology such as SCT/AT and TEA are uncertain to explore L2 learners' motivational dynamics. Instead, CDST and other cultural-historical psychology theories (i.e., SCT/AT and TEA) seem substantially independent or even indispensable, not allowing L2 motivation researchers to devise a research design in which CDST can function as a metatheory. Why is this so?

CDST and the theories of cultural-historical psychology have some principles in common. Both perspectives observe development as highly complex, denying the notion of language as innate in the brain and growing universally when triggers are input (McCafferty, 2016). Both consider L2 development from a holistic viewpoint and reject Kantian dualism and Cartesian reductionism. Also, as Aoyama and Yamamoto (2021) pointed out, in CDST, attractor states are where a dynamic system settles down, and self-organization is the interaction process by which the system components slowly develop towards an attractor state, while in TEA, EFPs are the point where different individuals' developmental trajectories converge, and at BPFs, those trajectories take different paths depending on the individuals' decisions. Therefore, "TEA traces the process of self-organization back from an attractor state by identifying signature dynamics at common passage points" (p. 285).

However, these two tenets diverge on one core feature: the notion of time. TEA emphasizes that time is "irreversible time" (Sato et al., 2009, p. 227) or lived time in which all lived experience is embedded in culture, i.e., in a specific time and place. The perspective of a cultural-historical approach to distributed cognition offers an additional notion of time frame. For example, Cole and Engeström (1997) conceptualize time into five hierarchical (vertical) planes with each lower level embedded in the level above. They take an anecdotal example of the event of a girl's birth and her mother's conversation, and describe the mother's speech (i.e., mother's cognition) on the two planes of time: the history of human beings on earth (*cultural-historical time*) and the life of the individual (*ontogenetical time*). The mother's cognition traces the past on the cultural-historical time plane, then the future on the ontogenetical time plane, and then returns to the present on the ontogenetical time plane (see Cole & Engeström, 1997, pp. 18–21).

In contrast, because *emergence* is one of its traits, CDST offers little in terms of when or in what condition an attractor state emerges and when it turns out to be an attractor basin, nor does it consider whether an attractor state and attractor basin can be chronologically connected. In this regard, Valsiner (2005) has criticized CDST for its scant attention to the historical aspects, saying, "[t]he attractor is assumed to 'attract' the present processes towards an equilibrium state somewhere in the future, but there is no conceptual equivalent to them in the immediate past of the trajectory" (p. 20).

In cultural-historical psychology, *causality* has been studied extensively. Engeström and Sannino (2012) examined the AT framework and concluded that it belongs to a well-developed *process theory* of learning. According to Jensen (2022), there are three different approaches and views related to causality. One of them is the process theory, originally called the *realist approach* developed by Bhaskar (1978), which accommodates the events and the processes to analyze how some events affect others.

CDST has recently started to take *causality* into a fresh account. Hiver and Al-Hoorie (2020) introduced five guiding principles for considering *complex causality* that can apply to CDST studies. Among these five, *hysteresis* might combat the critique by Valsiner (2005) above, although “a complex and dynamic treatment of causality and causal mechanisms remains more of a conceptual exercise at this stage” (Hiver & Al-Hoorie, 2020, p. 68).

Thus far, having examined the divergence between CDST and the theories of cultural-historical psychology, the final item to be addressed is a review and examination of the research design and methodology in Kimura (2022b) about the extent to which it is relevant to investigate between-theory comparisons with no precedent studies. The main trait of the research design in Kimura (2022b) is the application of CAQDAS to show the possibility of a broader theoretical construct between CDST and TEA, with the intent of guiding the conclusion that TEA is wholly internalized under CDST. In qualitative research, the role and value of CAQDAS is widely acknowledged (Gibbs, 2014; Miles et al., 2020), and NVivo (QSR International Pty Ltd., 2022) is one of the most disseminated qualitative data analysis software applications (Woods et al., 2016). For example, using NVivo, Dalkin et al. (2021) showed how CAQDAS aids with the theory generation, refinement, and testing in realist evaluations and realist program theory building.

To the current end, I will summarize the process and findings of Kimura (2022b) with a slight emphasis on the use of NVivo. The following are the essential elements in using CAQDAS as laid out in Kimura (2022b).

- 1) Transcribing interview data.
- 2) Importing the transcription.
- 3) Coding the interview transcription (first cycle coding).
- 4) Changing and developing the structures of the coding to elaborate on the interpretations of the data (second cycle coding).
- 5) Reading participants' interview scripts repeatedly.
- 6) Creating *Bifurcation Coding*. The concepts of each participant's bifurcation point were relatively clearly expressed in the interview scripts, and thus it was easier to find the references for *Bifurcation Coding*.
- 7) Following Waninge's (2015) methodology of determining attractor states from interview scripts, running NVivo's word frequency query to identify frequently used words or phrases in the interview data.
- 8) Viewing interview video portions containing these frequent words or phrases until the explorations became saturated. I selected the participants' references that could be considered as *Attractor States*.
- 9) Comparing the number of these two types of references among participants.

I concluded in Kimura (2022b) that CDST is a superordinate concept than TEA based on the higher numbers of participants in the attractor state references than those in the bifurcation point references. Indeed, the excerpts from these references revealed participants' broader inner voices relating to their L2 motivation, as explained in the previous section.

However, research always has some limitations, and Kimura (2022b) is not an exception. First and foremost, with only bifurcation point references, would it be valid to say that the study could fully conceptualize TEA's theoretical sphere? This issue is crucial to enhance the salience of the results further. Re-developing coding structures and re-evaluating the coding boundaries by including other TEA components should be done.

Second, is it methodologically plausible to say that the coding data from CAQDAS (e.g., that acquired by NVivo) can validate the possibility of a broader concept of CDST than TEA and, therefore, that CDST can play a broader metatheory role than TEA? A similar issue arises when qualitative researchers attempt to publish their papers in journals: namely, to what extent should they include the detailed process of CAQDAS manipulation?

Finally, and most importantly, the concept of the "broadness" of CDST over TEA might be misleading. Instead of viewing CDST as a superordinate meta-theory that entirely internalizes TEA, these two theories might be able to capture different aspects of L2 motivation from different angles about the same given phenomena. As such, the value of this conference presentation paper should be refurbished in a full paper soon after careful revision of the data analysis with the above limitations in mind.

5. Concluding remarks

Since the publication of the seminal book, *Complex Systems and Applied Linguistics* (Larsen-Freeman & Cameron, 2008), CDST has attracted significant interest in the SLA research community. The enthusiastic response of L2 motivation researchers to this theory led to another seminal book, *Motivational Dynamics in Language Learning* (Dörnyei et al., 2015). The next generation has now taken the reins and is continuously elaborating upon CDST. At the same time, TEA, another novel theory of cultural psychology conceived and expanded in Japan, has attracted the attention of many scholars both domestically and worldwide. How can the same peak be observed if different routes are taken? With this inquiry in mind, I will continue to commit to L2 teaching/learning motivation research from different theoretical perspectives.

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