

How Dynamic is Second Language Motivation? A Scoping Review of Complex Dynamic Systems Theory Research

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Research Overview

This scoping review provided an overview of longitudinal studies on second language (L2) motivation that adopted a Complex Dynamic Systems Theory perspective (CDST), spanning 1997-2025. Methodological characteristics and empirical evidence of CDST concepts were synthesised, highlighting the development of CDST in L2 motivation field.

Purpose of Study

1. To synthesise the design and methodological characteristics of existing CDST-based L2 motivational dynamics studies.
2. To summarize how key concepts in CDST relate to empirical evidence of L2 motivational dynamics patterns.

Research Methods

To be eligible for inclusion in this scoping review, study must satisfy the following criteria:

1. It must be empirical studies focused on L2 motivational dynamics.
2. It must explicitly adopt a CDST perspective.
3. It must include longitudinal design, which tracked L2 motivational dynamics overtime.
4. It must involve secondary school or university L2 learners as participants.
5. It must be published in English or Chinese.
6. It must be published between 1997-2025.

A comprehensive literature search was conducted across major international and Chinese databases: EBSCOhost, ProQuest, Web of Science and CNKI. All

identified records were conducted the title, abstract, and full-text screening process. As a result, 49 studies were included. Data extraction covered the country of study implementation, participants' characteristics, sample size, research context, participants' first language and target L2, study design, method, data collection instruments, study length, data analysis techniques, motivational patterns observed, and empirical evidence of CDST concepts. A critical appraisal was conducted using The Mixed Methods Appraisal Tool (MMAT) to describe the overall quality of the included studies.

Results and Discussion

The results showed the majority of studies ($n=31$) were published in the more recent period, suggesting a potential growth of research in CDST-based L2 motivation. Geographically, a substantial of included studies ($n=31$) were conducted in East Asian countries, especially in China and Japan, with English as the predominant target L2. In terms of participants characteristics, most included studies focused on university students ($n=38$), while sample size across the included studies varied largely, ranging from 2 to 1351 participants. Conventional instructed L2 classroom settings were the main research context.

Methodologically, study design, measurement, timescale and analysis techniques of the included studies were highly diverse. Longitudinal design was the most prominent approach ($n=41$), repeatedly measuring L2 motivation developmental trajectories over time. A rich variety of data collection instruments were used, including interview, questionnaire, learner's diaries, classroom observations, and idiodynamic measures, across mixed-method studies, qualitative studies, and quantitative studies. Regarding study length, data was elicited over a series of timespan, spanning years ($n=24$), months ($n=16$), weeks ($n=4$), hours ($n=3$), and minutes ($n=2$). Finally, a range of analytical techniques were employed (e.g. descriptive statistics, thematic analysis, multilevel modelling) to provide the empirical evidence of motivational patterns and connect these findings with key CDST concepts.

Across studies, L2 motivational patterns rarely followed a simple linear or stable pattern. Instead, motivational change typically displayed a non-linear, fluctuating, and phase-shift patterns, often influenced by contextual events such as exam and task demands. The findings suggested the inherently complex and dynamic nature of L2 motivation.

A wide range of CDST concepts were discussed across the study pool and supported by empirical evidence. Thirty-five studies provided empirical evidence of *inter-individual variation and intra-individual variation* in L2 motivational development, suggesting that motivation followed distinctive pathways across individuals, while also altering within the same individual over time. In addition, thirty-five studies offered evidence for the presence of strong motivational *attractor states*, in which motivation stopped fluctuating and settled into relatively stable condition despite of external disturbance. *Attractor states* transitions were also observed, including shifts between motivational self-concepts across different educational stages. *Interconnectedness* were identified across 30 studies, showing that L2 motivational dynamics were affected by interaction between motivation and related constructs such as anxiety, willingness to communicate and self-efficacy. A distinct proportion of studies (n=17) also established evidence of *sensitivity to initial states*, showing that learners' early motivational condition of L2 learning could cause a long-lasting impact on subsequent motivational development. Further evidence was also reported for *self-organization* and *co-adaptation* from the CDST perspective.

Overall, the result showed that L2 motivational dynamics were well aligned with CDST characteristics, which could be best interpreted as adaptive, dynamic, self-organized, and complex processes rather than static traits. Future research needs to adopt more complicated quantitative analytical techniques to model motivation dynamics. Greater attention needs to be paid to micro-timescale motivational fluctuation, such as motivational change during L2 classroom tasks. In addition, it is worth developing clear operationalisations of CDST constructs and building a solid link with L2 motivational dynamics.

Keywords

Complex Dynamic Systems Theory, L2 motivational dynamics, scoping
review