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Dynamic motivation of international students in a Hungarian as a foreign language class: longitudinal case studies

Most studies in SLA have viewed motivation as a static concept and approached it with traditional research designs (Chambers, 1999; Dörnyei, Csizér, & Németh, 2006; Gardner et al., 2004). However, the social world around us is dynamic and the introduction of CDST into SLA research has brought new ways of looking at language learning development. Many studies in motivation dynamics tracked the development of learning groups over multiple lessons, among which Pawlak (2012) and Poupore (2013) emphasized short-term motivational dynamics. These studies suggest that motivation can fluctuate on different time scales, ranging from minutes to hours, days, months, and years. This study tracks the motivational dynamics of 4 international students during their Hungarian as a foreign language class for 3 sessions using the Motometer (Waninge et al., 2014), which tracks their motivation levels every 5 minutes. The quantitative longitudinal method was combined with classroom observations and students' comments. The findings are in line with CDST principles of change and support the claims that in-class motivation cannot be viewed as a stable trait, given the variation detected on individual learners regardless of the overall high or low motivational level. Motivation changes over time on an individual level depend on context and other subsystems.

Keywords: complex dynamic systems theory, dynamic motivation, classroom-based research

1. Introduction

This study aims to investigate the motivation of international students to learn Hungarian as a foreign language. Generally, students have different language learning experiences which interact with their motivation and consequently affect the learning outcomes.

The aim of this study is to investigate the factors that influence motivation to learn Hungarian from moment to moment in the classroom. We will trace the behavior and motivation of four individual international students every five minutes during the course of three lessons of a Hungarian as a foreign language class at a Hungarian university. The study will make use of the 'Motometer' (Appendix 2) (Waninge, Dörnyei, & de Bot, 2014) and qualitative exploratory feedback the students gave.

The findings may help instructors create suitable classroom activities that develop learning while also accommodating diverse individual variances.

2. Literature review

Studying motivation changes over time is inspired by Complexity and Dynamic Systems Theory, combined as Complex Dynamic Systems Theory (CDST). Complexity theory was introduced into language learning by Larsen Freeman (1989, 1991, 1994), who argued that languages can be described as complex systems because they consist of many different but interdependent and thus interchangeable subsystems. The overall linguistic behavior is due to the interaction of the subsystems. This suggests that changes in a particular individual factor are likely to lead to changes in other subsystems. In recent years, the fundamental role of context has been increasingly recognized as an important element in language learning. Many studies have looked at the dynamic relationship between individual differences and learning situations, showing that learners may need to adapt not only to changes in their environment. This applies to students who choose to study abroad, as in this case. Indeed, it is impossible to separate a person from the context and ignore the effects of other factors.

In CDST, language is defined as a system constantly adapting and creating new conditions through self-organization and emergence, and language development as a pattern shaped by experience, social interaction, and cognitive processes (Cameron & Larsen-Freeman, 2007).

Internal and external determinants influence learning development and lead to growth and decay within the bi/multilingual system (de Bot & Larsen-Freeman, 2011). Due to interconnectedness of sub-systems, non-linearity and variability are inherent features of the system; thus, it is difficult to predict development (Larsen-Freeman, 1997; de Bot et al., 2007; de Bot & Larsen-Freeman, 2011). Variables are in complex and multitude interactions and are subject to change over time (Larsen-Freeman, 2019), which then leads to variation and variability among and within individuals (de Bot et al., 2007). Occasionally, the system prefers 'attractor' states at certain points in time over other 'repeller' states as described by de Bot and Larsen-Freeman (2011). There is no development in the attractor state; however, external and internal variables are constantly affecting the system, which may lead to positive or negative development at some point. As Verspoor and de Bot (2021) note, some of the variability may be developmental as the system is trying to reorganize and become less stable.

CDST has also found its way into the area of motivation. As Dörnyei et al (2006) suggest, motivation is "intended to explain nothing less than the reasons for human behaviour. Because of this ambitious aim, there is no general consensus on

the definition of the notion….” (p. 9). Until recently, many studies tried to identify the components of L2 learning motivation and studied empirically by cross-sectional macro studies. The importance of short-term motivational dynamics was emphasized by Pawlak (2012) and Poupore (2013), who tracked the development of learning groups over multiple lessons. Other studies have documented long-term trends in motivation development and have shown that motivation levels generally decline to some degree over the course of extensive institutional involvement (Chambers, 1999; Dörnyei, Csizér, & Németh, 2006; Gardner et al., 2004). These studies seem to suggest that motivation can fluctuate on different time scales, ranging from minutes to hours, days, months, and years.

The observed developmental fluctuations in student motivation may involve stable periods and predictable patterns (MacIntyre & Legatto, 2011) during interaction (de Bot, 2012). Moreover, the dynamic relationship between the learner and the context stabilizes the state of motivation in the face of discouraging contextual factors when the learner develops a clear vision as an L2 speaker. It has also been suggested that this is possible through a deliberate self-motivation strategy (Dörnyei, MacIntyre & Henry, 2014).

The discipline of group dynamics specializes in the knowledge of how people behave in various small groups. Motivational dynamics has been identified within the L2 field, which observes classrooms and strategies from a particular perspective (Dörnyei, 1997). Ushioda (2003) concluded that the social aspect of the classroom certainly helps to enhance and promote student motivation. The motivational effect of the social context includes many components, especially guidelines by the faculty and advanced practices due to copying certain behaviors of some influential members (Dörnyei, 2001).

In recent years, pioneering research by several scholars (such as Dörnyei, 2001, 2005, Ortega, 2009, Pawlak, 2012, Pawlak et al., 2014, and Waninge et al., 2014) have opened the way for a more thorough investigation of learners' motivation with an eye on motivational variation over time. According to Hiver and Papi (2020), complexity has made methodological contributions to the study of motivation, assisting in the creation of research programs that highlight adaptive and developmental processes. Even though academics are growing more interested in delving into motivational dynamics, research on the dynamic nature of motivation remains limited and inconclusive.

Empirical research in the domain of motivational dynamics is limited. Campbell and Storch (2011) for example explored motivational swings over the course of a semester at an Australian institution at the turn of the century. According to their findings, learning environment characteristics were the most critical variables that had a positive and negative influence on motivation. Azarnoosh et al. (2015) looked

at the longer-term changes in student motivation. Other elements such as learners' age groups, learning environments, and socio-cultural background were also considered by the researchers in producing diverse motivating patterns. MacIntyre and Serroul's (2015) study is more comparable to the current study's objectives as their research also looked at motivational shifts during performance. They investigated the potential changes in task motivation based on approach-avoidance evaluations using a range of tools. The results revealed that participants' motivation assessments were highly variable. The findings demonstrated that motivation may be influenced by a variety of factors, including instructional emphasis, learners' emotional state on a given day, group dynamics, the teacher's motivational state, and a variety of contextual variables, such as the day of the week and class schedule. We expect to observe, as Waninge and colleagues (2014) concluded, variation on the individual level and variability on the group level.

3. The study

Based on the literature review, this study addresses individual in-class motivation to investigate the following research questions:

1. To what extent can variability and stability be detected in students' in-class Ln motivation context?
2. What characterizes the Ln learning motivation levels change on the individual-level and group-level?
3. What is the effect of classroom and learning context on change, variability, and stability?

3.1. Participants

The students are enrolled in a Hungarian language class for the credit completion and scholarship requirements. The class has 71 students taking A1 Hungarian as a foreign language class in Hungary and they have 90 mins classes two times per week. The main aim of participant selection was to find students with different personalities and backgrounds to represent the class composition. The observations took place in the 11th week into the semester. After a brief consultation with the language teacher, a quick chat with the students and prior acquaintance with some of them, we selected four students based on personality and in-class behavior to represent a diverse group. The students range from 18 to 22 years in age, with cultural backgrounds from South-east Asia.

Student 1, T is described as an attentive and good student as she usually pays attention to the teacher and makes effort in and out the classroom. Student 2, J, can sometimes get distracted and lose attention to the task at hand, but requests a second

clarification. Student 3, D, actively participates and asks questions. Student 4, C, does other things in class besides doing activities and selectively pays attention only replying when asked directly.

The students' general characteristics and learning characteristics are shown in Table 1 which are based on classroom observations and conversations with the teacher and the students. The profiles highlight students' in-class behavior during the Hungarian courses.

Table 1. Student profiles

	General characteristics	Learning characteristics
Student 1 Female	Serious about learning. Enthusiastic, but stays quiet in class. Learns better with blackboard.	Learns easily and finishes the tasks relatively faster than her peers
Student 2 Male	Easily distracted and seems struggling with the activities	Studies without putting any effort and procrastinates
Student 3 Male	Participates and explains the task to his neighboring peers	Keeps up with the homework and classroom tasks
Student 4 Male	Seems distracted but tries to keep up with the classroom tasks	Does not put effort into studying languages

3.2. Instrument

Motivational dynamics has grown into a major research topic in applied linguistics (Dörnyei, MacIntyre, & Henry, 2014) which requires some methodological considerations and instrument development. The *motometer* was originally developed by Gardner and his colleagues (2004) for single measures of state motivation tracking participants only for four times throughout the whole academic year. Waninge et al. 's (2014) adaptation is designed to detect motivation variance within a lesson. It is concise and does not disturb any of the students. In this sense, this adaptation does not differ from Pawlak's (2012) 'motivational grid'.

The 'motometer' consists of 10 figures shaped as thermometer on a percentage-based scale from 0 to 100, with each figure prompted every 5 minutes representing intervals of a 45–50-minute session (see Appendix 2). The participants are asked to rate their motivations based on how much effort they are willing to put into a given task and to what extent they enjoy the task. The prompting is either done by their teacher or a timed soft bell sound as done by Waninge et al. (2014). Each feedback

paper had a comments section after the 'motometer' to record the qualitative explanations of students' experience.

When implementing the motometer, the researcher keeps track of the observations, the lesson plan, the activities, and classroom events, to provide context to motivational variation. Appendix 1 illustrates classroom activities throughout the sessions.

3.3. Data collection procedure

Before the first session, the selected students were introduced to the 'motometer'. They did not find the recorded soft bell sound invasive, as it was similar to a text message they receive on their smartphones. Students received a printed 'motometer' paper and were instructed to report their motivation level on the scale every 5 minutes. While the students were learning Hungarian in the classroom, the researcher wrote down starting time of each activity and students' reactions and behavior during the entire task, such as the interaction with each other and the teacher, participation or asking questions.

3.4. Data analysis procedure

The motometer supplied the quantitative data needed to explore the variability and stability in each participant's motivation. The qualitative data was utilized to investigate whether the context led to any noticeable variability and stability in the participants' motivation.

Student profiles were created based on the recorded observations and teacher comments. The motometer data were numerated by the students in percentage which made the analysis easier as opposed to what Waninge et al. (2014) did with motometer line and bottom distance measurement in millimetres. The quantitative data from the motometer and the qualitative data based on observation data and students comments were entered in excel for each participant.

The motometer data and observational data from the third sessions were combined in a composite chart, where participants' motivation levels were linked to the observational data, which were placed under the timescale.

4. Results

In accordance with previous studies on motivational dynamics (MacIntyre and Serroul, 2015; Waninge et al, 2014), this study found variation in the motivational level of students throughout the classes. In order to represent the motivational dynamics of each student and the contextual cues (e. g. activity or task), composite charts for each session/class have been created which can help to interpret the

changes. Figure 1 is the composite chart of Session 3 and it offers an illustration of the Hungarian language classes. The horizontal axis consists of time in steps of five minutes, under which there is a list of activities in each session and lesson plan progress, identified as general classroom activity, and another level showing classroom observational comments, identified as episodic instances. The comments collected from motometer answers are included in separate blocks.

Figure 1. Composite chart of Session 3
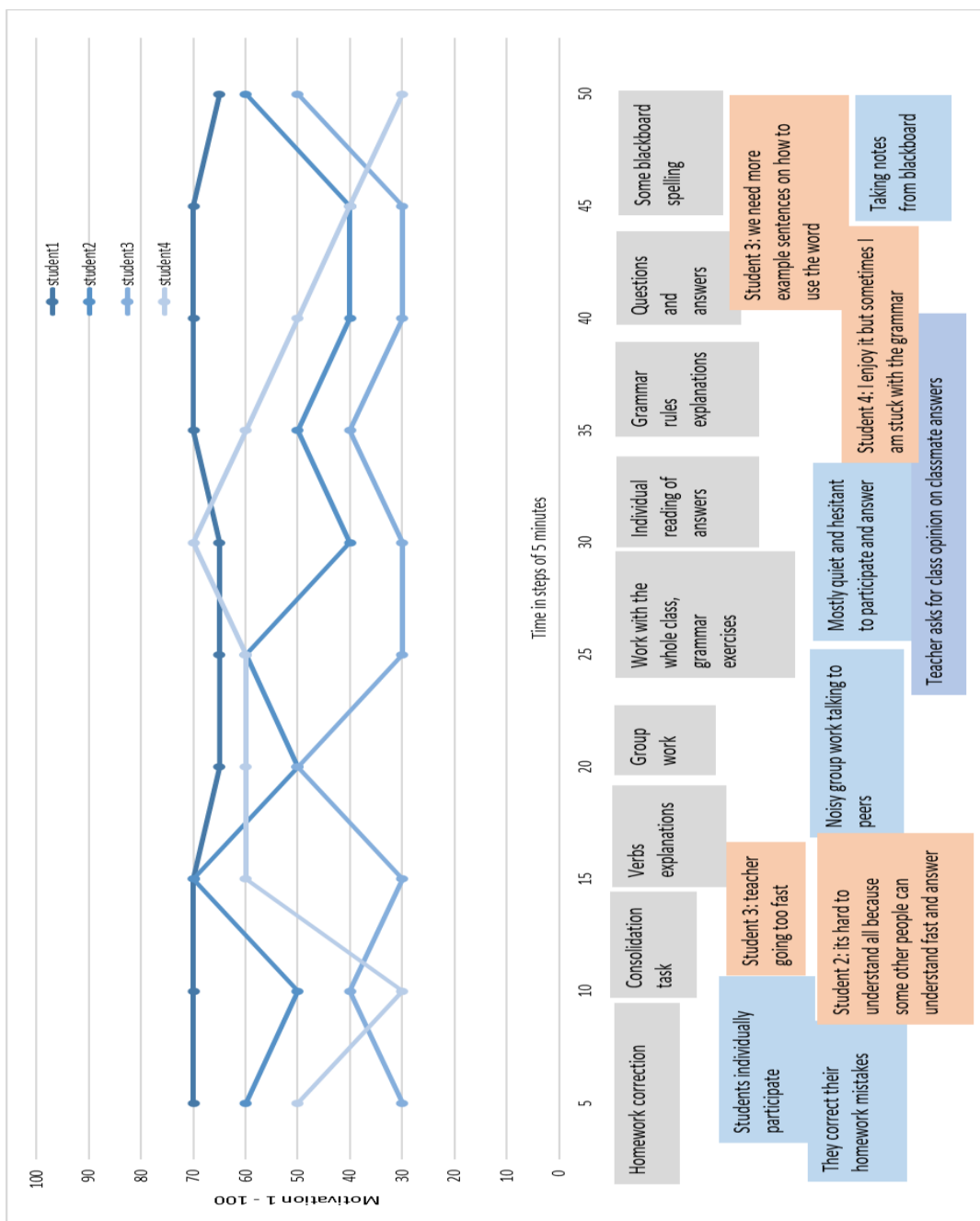
As it can be seen on Figure 1, Student 1 manifests relatively stable and high motivation throughout the whole class, while the rest of the participants show frequent changes. Their comments show that one of the sources of motivational drop is the heterogeneity in the classroom which, according to Student 2's perception, is not addressed by the teacher.

4.1. Change and Variability

Figures 1-3 show motivation scores at the group level. For the overall group motivation, the pattern in Figure 1 shows a fluctuating increase in the first session from a moderately low level (47.5/100) to a moderately high level (63.75/100), while the other sessions show a constant moderate level from 58.75/100 to 57.5/100 in the second session (Figure 3) and from 52.5/100 to 51.25/100 in the third session (Figure 4).

Figure 2. Hungarian lesson 1, group average of motivational progression
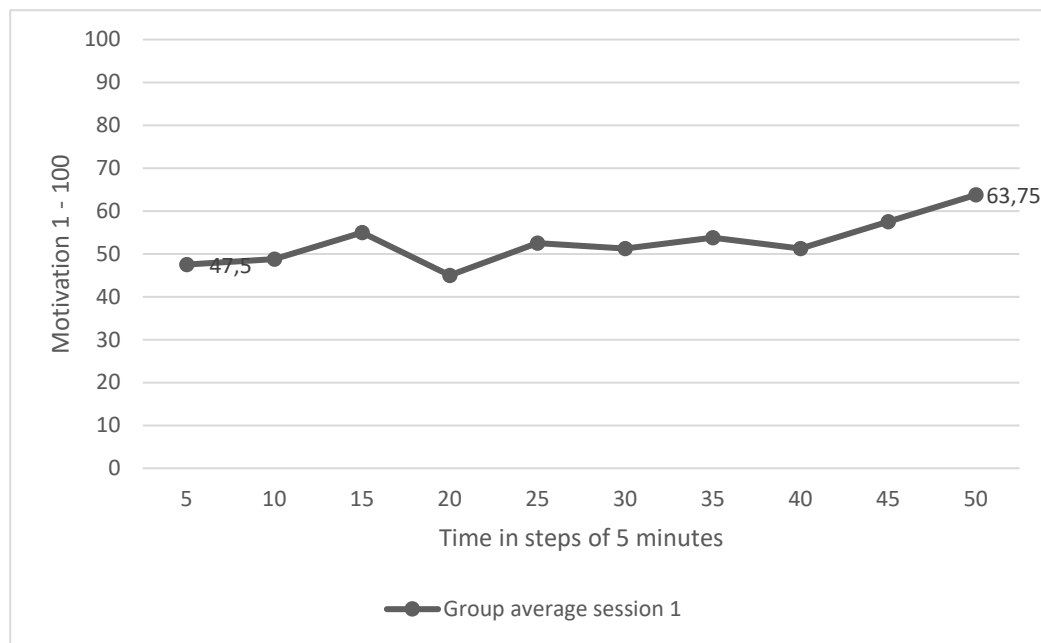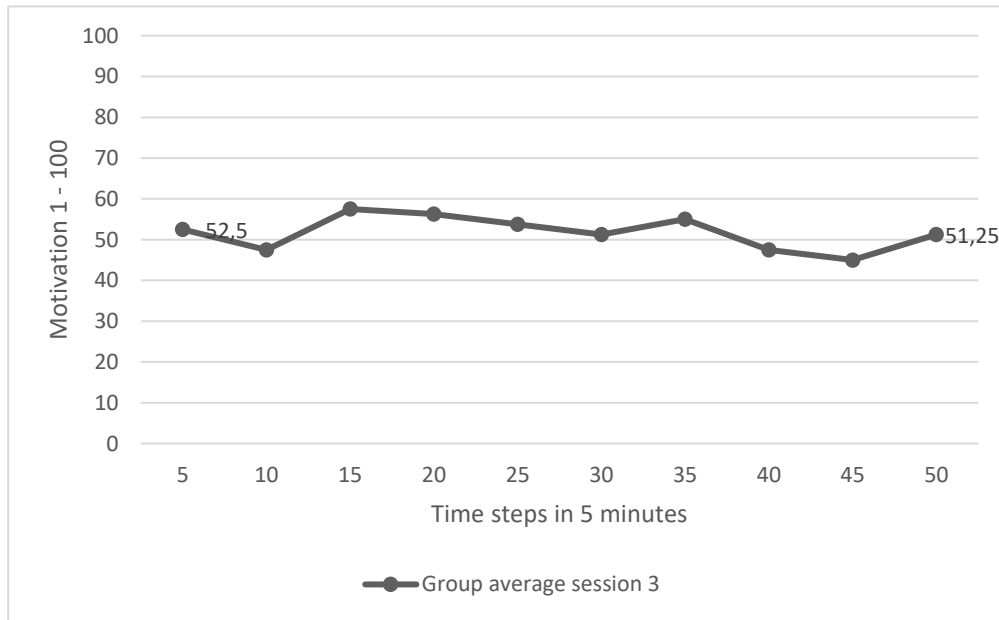
**Figure 3.** Hungarian lesson 2, group average of motivational progression
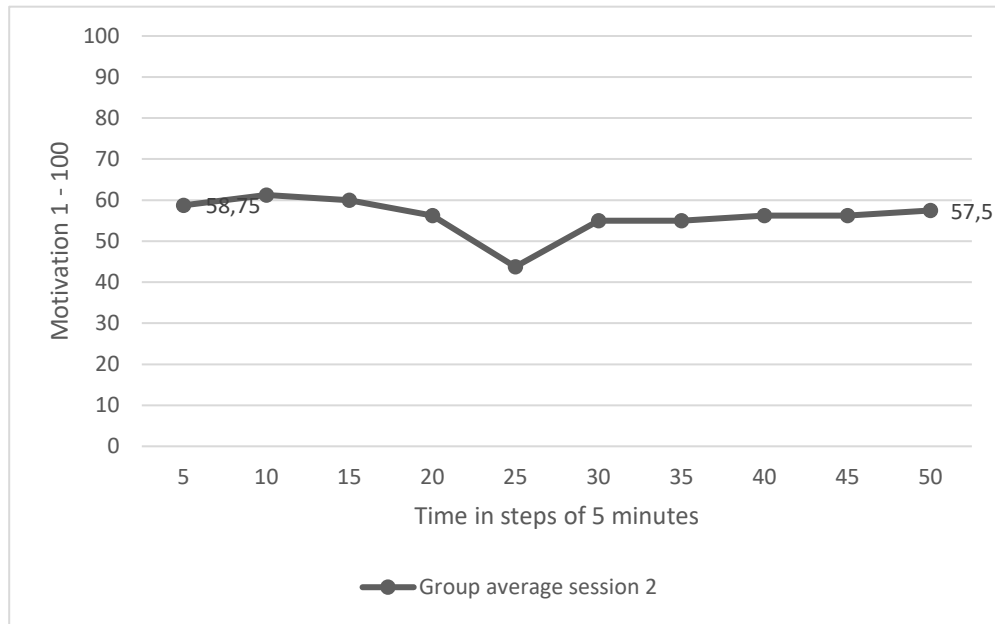
**Figure 4.** Hungarian lesson 3, group average of motivational progression

Whereas the group displays little variability, the individuals do. At the individual level throughout the sessions there are ups and downs. Figures 5-7 show that Student 1 kept a relatively constant motivation in the third session with a slight variation of 50/100 during 50 minutes from a high 70/100 to a high 65/100. Student 2 and 3 show an increase and a decrease variation in the moderate range (40 to 60 /100). Student 4 gained sudden motivation in the first session, from a low 30/100 to a high 90/100,

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and second session, from a moderate 50/100 to a high 80/100, but seemed rather unmotivated during the third session, from a moderate 50/100 to a low 30/100.
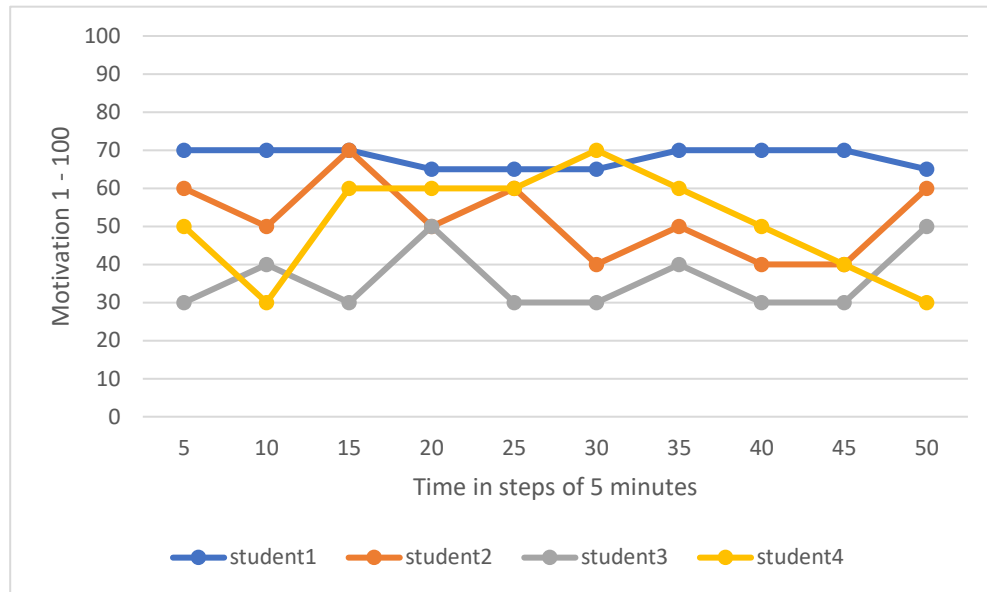
Figure 5. Motivational development individual progression during Hungarian lesson 1
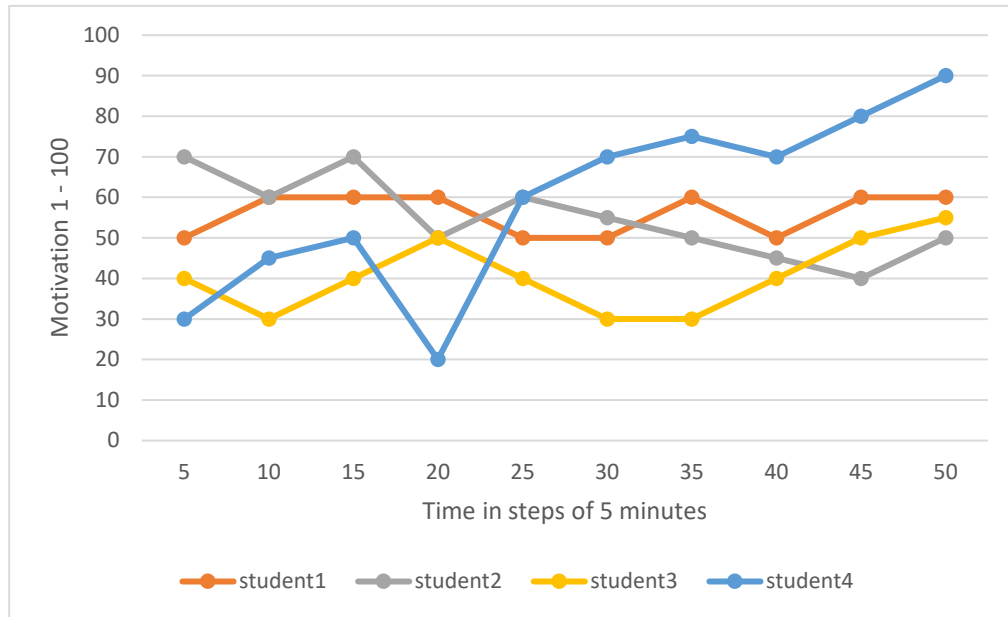
Figure 6. Motivational development individual progression during Hungarian lesson 2
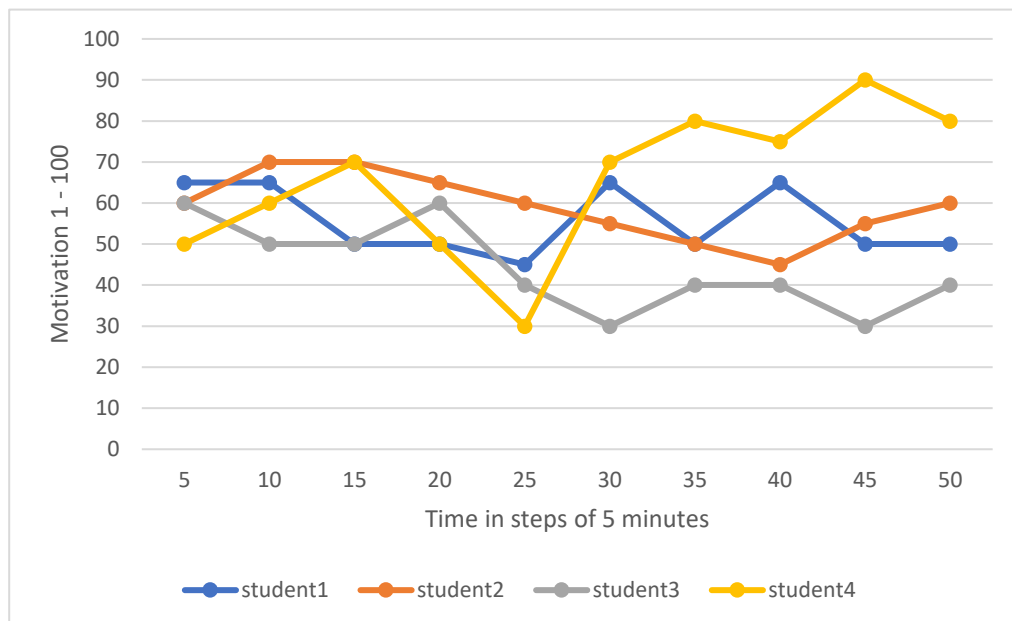
Figure 7. Motivational development individual progression during Hungarian lesson 3

The variability in these individual motivation progressions can be traced back to contextual factors. When student 4 could not understand the task, he reported low motivation at 20/100 in the first session, then he gained the highest motivation among participants for that session (See Figure 8), commenting "*it was boring a bit and after I knew the task, I really enjoyed it*". Student 4 struggled with grammar and gradually lost motivation at Minute 30 in the third session.

Figure 8. Student 4 motivational development progression in session 1 and session 3
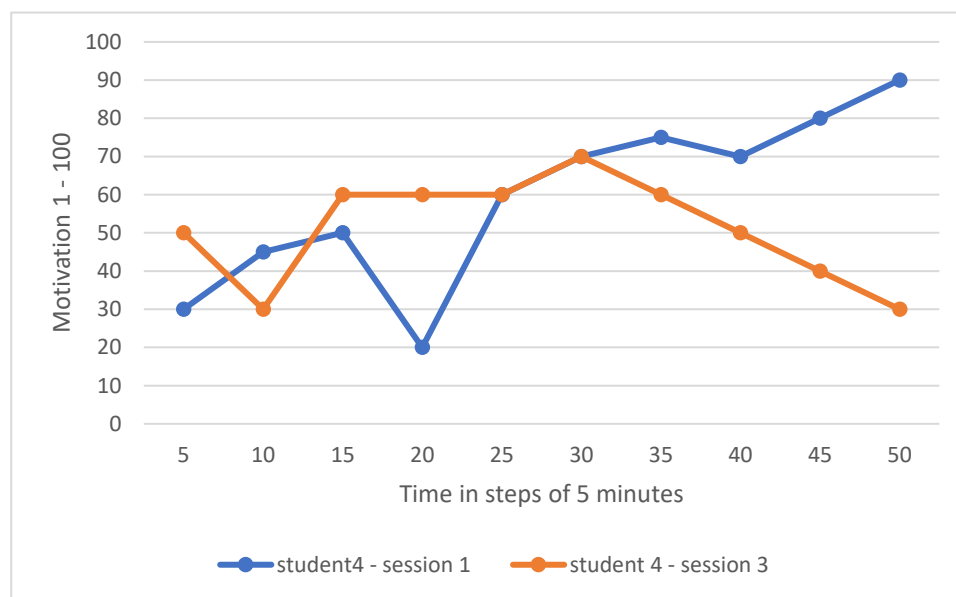
Figure 9 shows another instance regarding contextual influence. Student 2 always reports a low motivation after minute 20, which is always during the group work activities. His motivation showed variability when his classmates replied correctly, and he was not allowed enough time to think about the answers, commenting "it's hard to understand all because some other people can understand fast and answer the question"

Figure 9. Student 2 motivational development progression in all the sessions
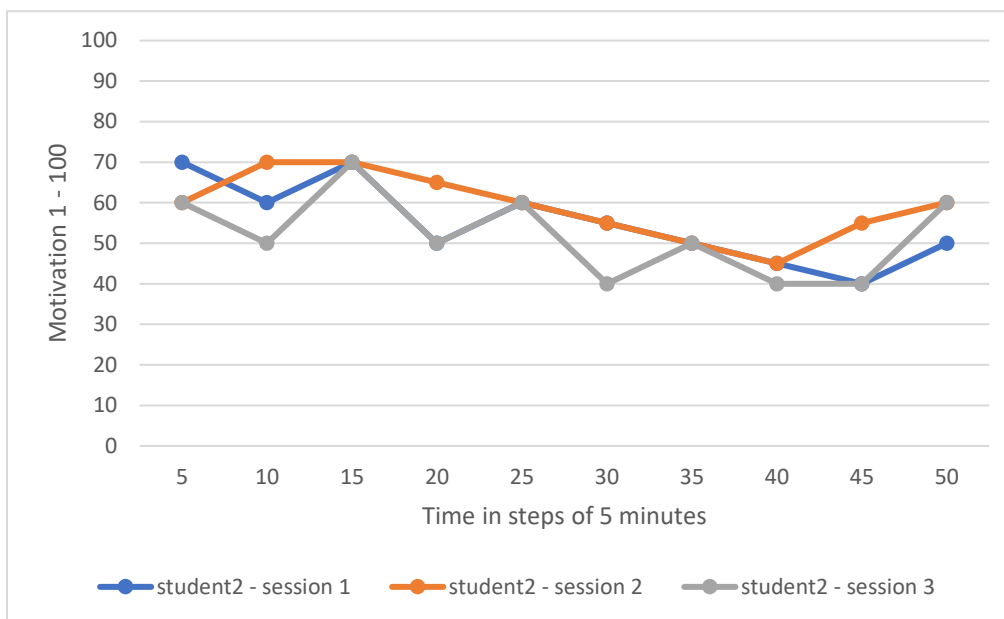

Figure 10 shows average motivation per student per session. Student 3's motivational state in class is the lowest among the participants, on average reporting a moderate low 40.5/100 then a slight increase on average 44/100 then a drop to a low 36/100. Student 3 commented that the "*teacher going too fast*" while "*we need more example sentences on how to use the word*", recommending to his teacher to "*have more exercise about specific topic that we learn on the session before moving to the new topic.*" Student 3's motivation drops if he felt the teacher was progressing in the lesson too fast without enough practice.

Interestingly, student 1 and student 3 show a similar motivational pattern despite the overall motivational range difference. Every time the teacher skipped practice and moved on to the next lesson in the same session, their response reflected a negative impact. In fact, both students reported that "*teacher going too fast*" and "*fast speaking could distract the learning process for some students.*"

Figure 10. Motivational development average for individual progress throughout the Hungarian course sessions
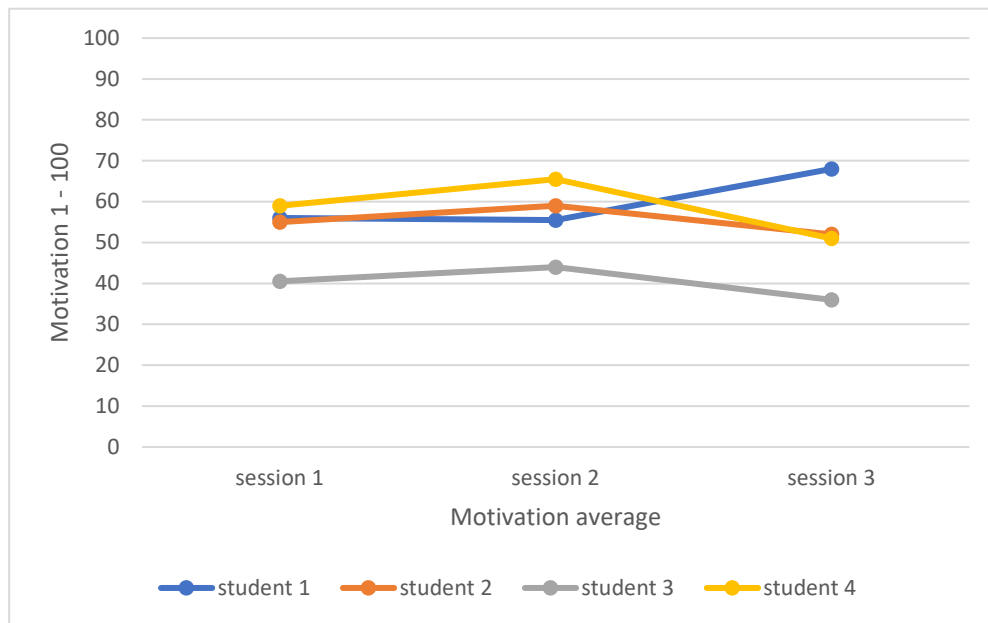
Figures 11 and 12 compare Student 1 and Student 3 in two consecutive sessions. They show that students with similar motivational patterns in one lesson can have an opposite outcome in the next one (Waninge et al., 2014)).

Figure 11. Student 1 and student 3 motivational development progression in session 1
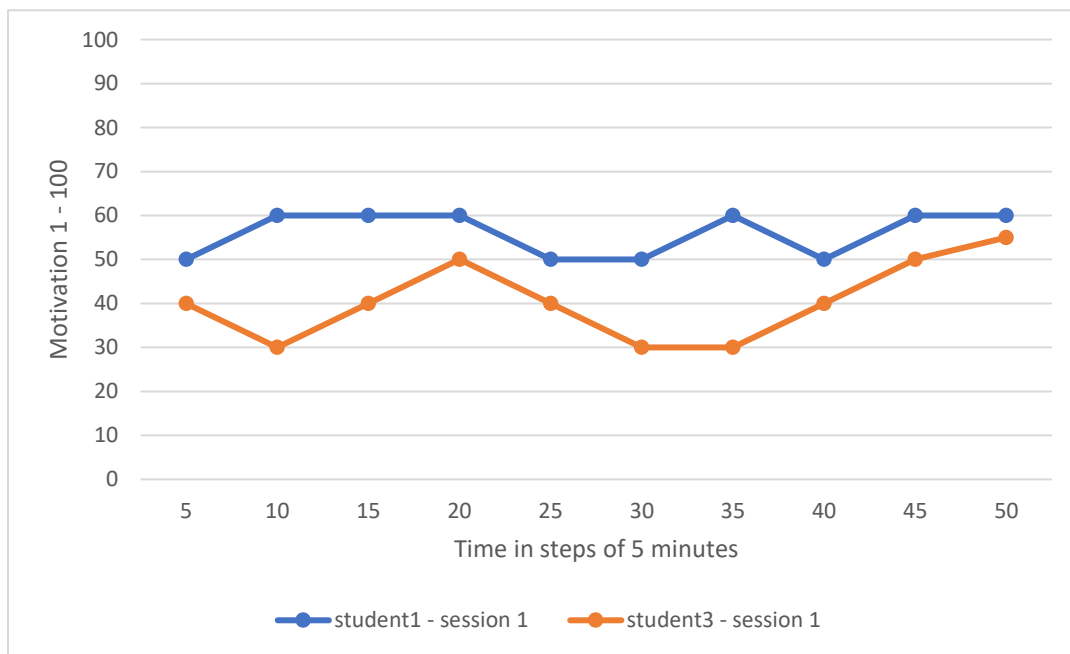
Figure 12. Student 1 and student 3 motivational development progression in session 2
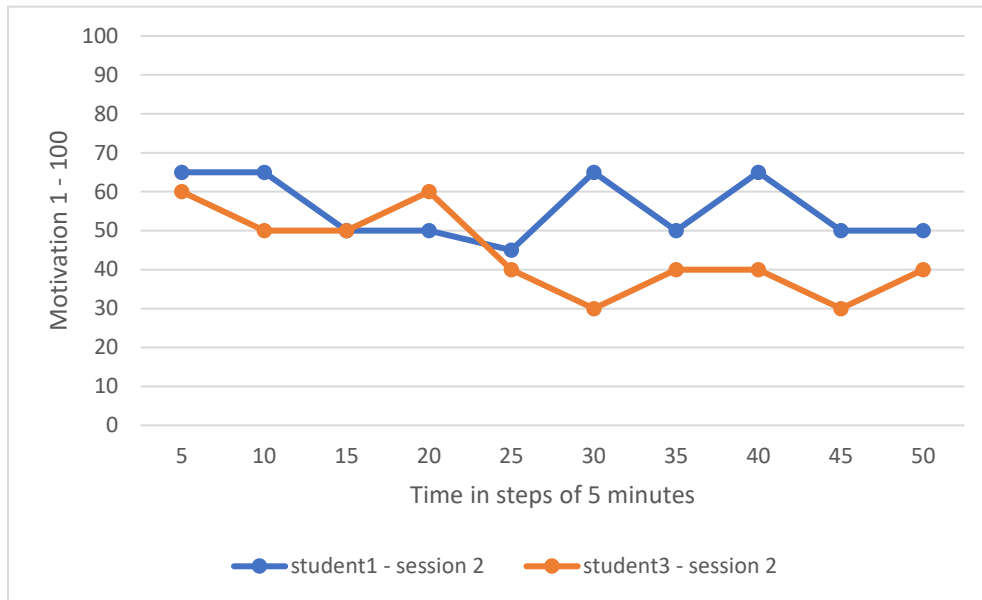

Figure 13 illustrates participants motivational change over the course of all three sessions (with lines separating them). While the dominant pattern is moderate with gradual increase or decrease in motivation, student 4's pattern showed stronger ups and downs.

Figure 13. Participants motivational development progression throughout all sessions
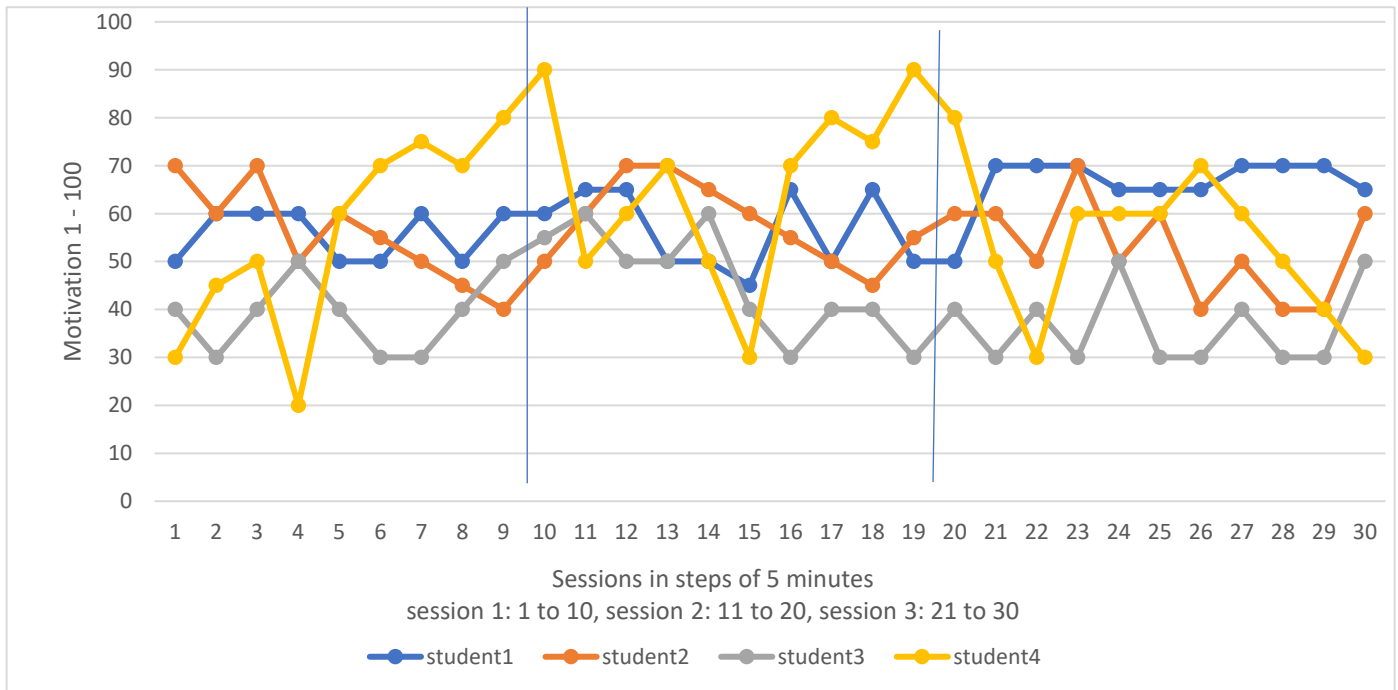
Figure 14 shows that with the group average. Observing the contextual information shows a commonality within the same session between the group average motivational development and individual progression: During the consolidation task and homework correction, students' motivation similarly spiked in Minute 15 (resulting in increased motivation, which was also mentioned in student 4's comment "*it was boring a bit and after I knew the task, I really enjoyed it*". Even on the individual level this reaction can be perceived in an increase of motivation.

Figure 14. Hungarian lessons 1, 2 and 3, group average of motivational progression
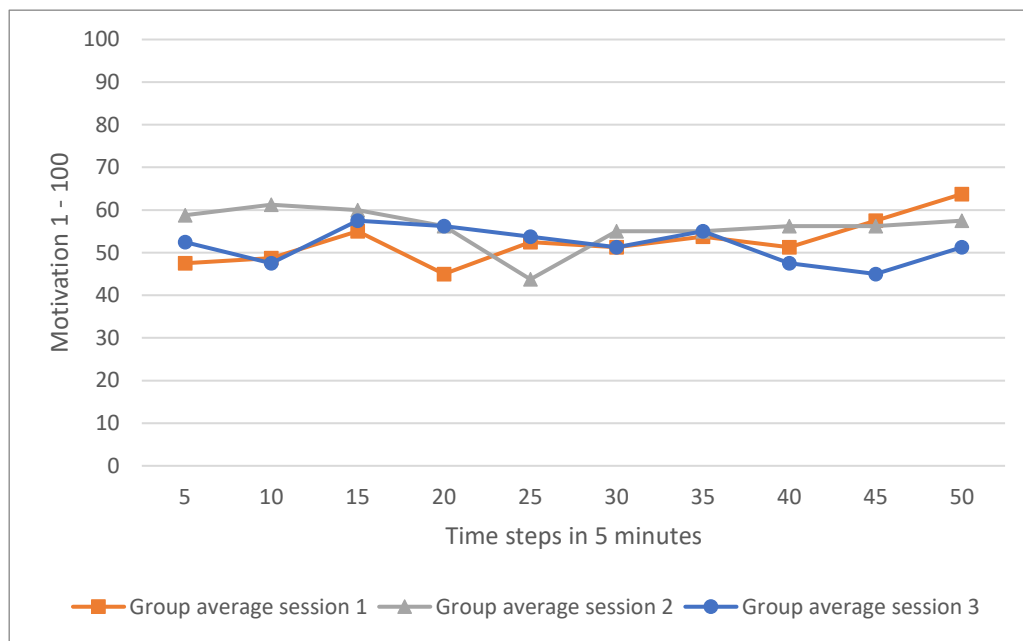
5. Discussion

Motivation along other ID variables have long been considered a static concept and only recently has been approached from a dynamic perspective. This study aimed at exploring inter- and intra-individual variation in the motivation of four students attending Hungarian as a foreign language class. Answering the research question regarding variability in students' in-class motivation, the findings confirm motivation variation even on a short timescale. Within the span of a 45–50-minute session, we observed shifts in motivational levels and variation in individual learners' development, confirming Larsen–Freeman's (2006) claims. The average group data did not show variation as the individual variation did, which was also inconsistent with the individual trends. As Waninge et al. (2014) concluded, although the group average may show a steady increase or decrease, there is a different motivation trend at the individual level. Challenging the students' learning

pace may reduce their learning enjoyment which can be an attractor, causing motivation fluctuation, if repeated too often.

The quantitative data indicated a level of individual heterogeneity in the motivational development of the four individuals. Each participant's motivational development demonstrated variability (change) and periods of stability during the duration of the observations. Furthermore, when compared to the group average motivation development, several of the individual motivational development patterns exhibited surprisingly divergent findings. This is in line with dynamic system theory, which emphasizes the individual since data at the group level can be deceptive. The qualitative data revealed that context was associated to the quantitative data fluctuations. The contextual information, on the other hand, revealed that the individuals' motivational systems were unique and evolved in their own way, with the same input producing completely distinct motivational development for each participant. In most circumstances, internal and external factors can be used to identify distinct system advances.

The composite chart illustrated the instances when participants reacted similarly and their relevant attractor states. Certain behaviors were due to some contextual factors: the noisy group work, teacher's open criticism to students' answers, and difficult grammar exercises caused a significant drop in all students' motivation levels. Several students noted that the teacher went too fast and that affected their motivation. Concerning stable levels and attractor states, a stable level of overall motivation was observed within a span of a week. We also observed regulating influence for some students that had to do with their attitudes toward the teacher and the language, which resulted in a matching engagement level in classroom activities. The system trajectory was dependent on students' attitude and system's initial condition. A relevant example is the case of student 1 who experienced discouraging incidents in session 3, yet reported a stable motivational trajectory, which could be justified by her initial motivational level with which she attended that session. Considering the importance of the initial level of motivation, it is recommended to invest in engaging warm up activities at the beginning of the session, which was not addressed by the teacher in this study.

Sometimes certain context and classroom episodic incidents may influence certain reactions. Students did not react proportionately to the same regulating forces, which shows the nonlinearity in system behavior and goes with DST principles.

When compared to Waninge et al. (2014)'s findings, in-class motivation appears to be dynamic. Individual differences in motivational development were demonstrated in system behavior in relation to the interconnected nature of context, implying the necessity to study motivation at the individual level and to consider context in the interacting system, as Larsen-Freeman (2006). Findings suggest that

motivation studies on a group perspective does not reflect individual variations in motivated development and may be deceptive.

Considering motivation as a dynamic system implies that the related factors are not static in a dynamic system over time, and that they are in constant interaction with each other and their context (Larsen-Freeman, 2009). Context was also previously considered a factor as it is inextricably linked to the system and its behavior in a dynamic system.

The results for the first research question are likewise consistent with those of MacIntyre and Serroul (2015), who observed comparable motivational shifts in task performance, however their instruments were similar to the current study, as previously indicated..

6. Conclusions and limitations

The portrait that we draw from this classroom motivation micro-study is a composition of dynamic stability, governed by attractor states, and individual variability. Some situational incidents may cause variability, which is also governed by nonlinearity and may impact behaviors differently. While this may seem complicated, language teachers should understand the dynamic aspect of a classroom between chaos and order.

Although Waninge et al. (2014) recommended a small-scale study for classroom dynamic motivation research, a larger sample during more frequent sessions would provide more accurate overview of classroom system behavior and possible attractor states. Participants in this study were selected 11 weeks after their first session during a course schedule that allowed them to freely join anytime. Committed students would present higher meta-motivational awareness to regulate the episodic incidents. Perhaps a second observation would have resulted into richer analysis to avoid the questionable reliability of the same researcher handling the data collection and analysis. Although we faced limitations and challenges to administer these tests, we traced the motivational variation for each participant and identified the DST principles in our analysis as an attempt to model the behavior of dynamic systems.

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Appendices

Appendix 1
Classroom activities throughout the sessions.

Table 1. Classroom activities throughout Hungarian lessons

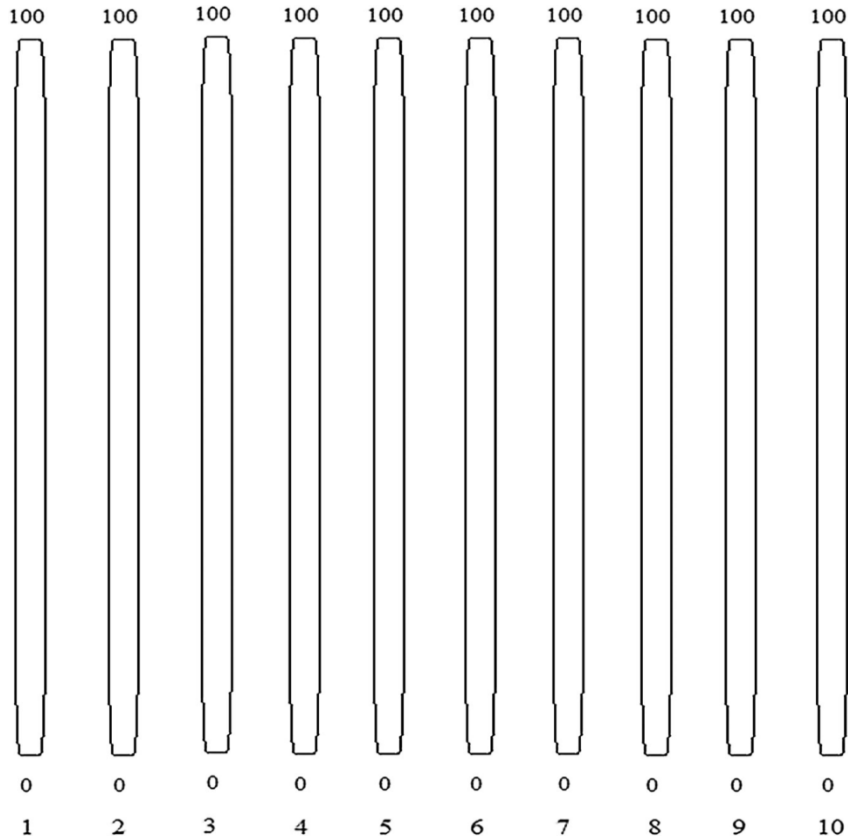| Sessions	Classroom activities
Session 1 50 minutes	Homework correction: allocative determinate
	Consolidation tasks
	Activity from the exercise book Dealing with surfaces and places
	Reading activity accompanied with class work to answer the reading comprehension part
	Grammatical rules explanation Indefinite articles
Session 2 50 minutes	Homework correction: time
	Consolidation tasks
	Reading task and meaning discussion from the textbook Turn-taking to read aloud
	Vocabulary and ending form consolidation
	Grammar activities from the exercise book: verbs and pronouns
Session 3 50 minutes	Homework correction: verb ending
	Reading activity while underlining verbs
	Board explanation: subject verb agreement
	Consolidation task
	Conversation activity: pair work, questions and answers

Appendix 2

Waninge et al. (2014)

Motometer

Rate your motivation, considering

- How much effort do I want to put into learning the material right now?
- How much do I enjoy this lesson right now?

100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10

Comments:

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