Motivational Dynamics in Language Learning: Change, Stability, and Context

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Motivation as a variable in L2 development is no longer seen as the stable individual difference factor it was once believed to be: Influenced by process-oriented models and principles, and especially by the growing understanding of how complex dynamic systems work, researchers have been focusing increasingly on the dynamic and changeable nature of the motivation process. In this study we micro-map the motivational dynamics of 4 language learners during their language lessons over a period of 2 weeks, using a novel instrument—the Motometer—combined with classroom observations and a questionnaire on motivation and attitude. The article answers three current questions concerning L2 motivation: (a) Can we demonstrate variability in students’ L2 motivation in class; (b) Is there a detectable stable level of students’ in-class motivation; and (c), If both of these are demonstrated, can they be accounted for by the classroom context? The results affirm that student motivation can be successfully explored using a dynamic systems framework. Our findings demonstrate how motivation changes over time on an individual level, while also being characterised by predictable and stable phases, and how it is inseparable from the learner’s individual learning context. The data also show that motivation can be meaningfully studied at different interacting time scales.

Keywords: motivation; emergentism; foreign language (FL) learning; classroom-based research

OVER THE LAST DECADE, APPLIED LINGUISTICS has seen an intriguing dynamic turn in research approach as an increasing number of scholars started to adopt aspects of a complex dynamic systems perspective on language development. Whether this was done directly under the heading of the related paradigms of Emergentism, Complexity Theory, or Dynamic Systems Theory (e.g., de Bot, 2008a; Dörnyei, 2009b; Jessner, 2008; Larsen–Freeman, 2006; Larsen–Freeman & Cameron, 2008; Mercer, 2011a; Verspoor, Lowie, & Van Dijk, 2008), or without explicitly adopting a
dynamic systems framework (e.g., Ahmed et al., 2011), the overall emerging picture is that of a broad shift that has departed in several respects from traditionally established viewpoints. One of the most radical consequences of this paradigm shift has been the growing recognition that straightforward cause–effect relationships are no longer sufficient in themselves to explain all the complex patterns observed in SLA data. While this does not mean that systems are always in a state of unpredictable flux—we can often identify relatively stable phases and recurring patterns within the variation of system behaviour—the lesson of related studies has been that linear predictability cannot be taken for granted as a default. This conclusion questions some of the main tenets of statistics-based quantitative research methodology, and the situation is further complicated by a second feature of the dynamic conceptualisation of systems, namely that the context in which system behaviour occurs is now seen as part of the developing system rather than a distinct background variable. By definition, this characteristic increases the social sensitivity of research conducted in a dynamic systems vein; at the same time it also adds further layers to the research paradigms necessary to study the complex interaction of language, agent, and environment. Consequently, as Do¨rnyei (2009b) concludes, “operationalizing this dynamic relationship in specific theoretical and measurement terms takes us into rather uncharted territories, with few specific guidelines or templates currently available to follow” (p. 244).

One of the seminal papers that put the complex dynamic approach on the SLA research map was Diane Larsen–Freeman’s (2006) study of the L2 development of five Chinese learners of English in terms of accuracy, fluency, and complexity. Larsen–Freeman demonstrated convincingly that an analysis that was based merely on group averages was likely to hide important individual patterns of learner development that came to the surface only when an individually focused and contextually sensitive methodology was applied. The present article follows a similar agenda by focusing on individual learner characteristics, specifically on language learning motivation situated in a classroom setting. Through the combined application of novel methodology that takes online measurements of the learners’ motivational disposition on a micro level and questionnaires that focus on the macro level of the learners’ overall motivation and attitudes, we explore the nature of three key aspects of the dynamics of motivational development: change, stability, and contextual dependency. In doing so, we intend to demonstrate that some aspects of motivational variability can only be made proper sense of if we apply a complex dynamic systems framework.

THEORISING COMPLEX DYNAMIC SYSTEMS

Even a quick scan of the field of applied linguistics produces a picture of the growing awareness of the significance of systemic, non-linear patterns in SLA data. After Larsen–Freeman’s (1997) pioneering study on chaos/complexity theory, three special issues of leading international journals highlighted the topic (de Bot, 2008b; Ellis & Larsen–Freeman, 2006; Hawkins, 2008), followed by two books (Larsen–Freeman & Cameron, 2008; Verspoor, de Bot, & Lowie, 2011) and several articles on systems phenomena (for a recent overview, see Larsen–Freeman, 2012). In view of this burgeoning literature, there can be little doubt that the application of a dynamic systems perspective has resonated with the SLA research community. While the specific paradigms that scholars have applied in their investigations show variation according to which feeding discipline they originated in (e.g., mathematics, biology, developmental psychology, or philosophy), the various rubrics employed—Chaos Theory, Emergentism, Complexity Theory, and Dynamic Systems Theory—represent similar, although not identical, strands, whose overall aim is to view phenomena in a holistic and systemic manner by acknowledging the interrelated nature of the components within the system and the often nonlinear manner of self-organisation and emergence by which the system evolves and responds to both external and internal stimuli. For simplicity’s sake, we will refer to these strands under the umbrella term of Dynamic Systems Theory (DST) (for a discussion of how the various strands differ from each other, see Dörnyei, 2009b). In order to understand some of the main principles and potential benefits of a dynamic systems perspective, let us look at three core characteristics of system dynamics: change, stability, and context.

Change

One of the central features of a dynamic system is its continuously changeable state. The word state refers to the position of the system—that is, the object under study—at a given moment, such as a student’s level of motivation or the number of words in a student’s vocabulary. A system is
considered dynamic when it has at least two or more key elements that are interlinked with each other but which also change over time. DST emphasises the significance of this temporal variation and evolution, highlighting the fact that the observed change can be nonlinear (for recent discussions, see MacIntyre & Legatto, 2011; Mercer, 2011a; Spoelman & Verspoor, 2010; Van Dijk, Verspoor, & Lowie, 2011). Nonlinearity refers to the phenomenon whereby a system’s change in output is not proportional to the change in received input (e.g., an increase in exposure to the L2 does not lead to an equal increase in proficiency); it follows from this that in nonlinear systems there are no automatic and predictable cause–effect relations governing the system’s behaviour: A huge amount of input can sometimes have little or no impact, whereas at other times, to take the other extreme, a minimal increase in input might have an unexpectedly large effect in propelling the system forward, a phenomenon sometimes called the butterfly effect. A consequence of this nonlinearity is that researchers should expect to find unpredictable changes in a system’s state that cannot easily be attributed to any specific single cause.

**Stability**

With the emphasis on variability and nonlinear change in DST, one might rightly ask how it is possible at all to study a dynamic system. Why formulate a research question when the system under study might show nothing but unpredictable behaviour? This is where a second principle of DST becomes important: Despite the emphasis on change and ongoing system dynamics, DST also recognises stable states in system behaviour. Dynamic systems are known to self-organise, as a result of which they can settle into preferred states—referred to as attractor states—during their development. Interestingly, some behavioural outcomes of the system’s self-organisation process are so stable that they seem to be programmed or hardwired; an example is that most children learn to walk and speak a language up to an advanced level (Thelen, 2005). The important point from a research perspective is that it is this stability of the system that allows salient outcomes and patterns of development to become visible (Mercer, 2011b; Van Geert, 1998). While in theory the possible developmental patterns for a system can be endless, in reality the system’s self-organising function results in a limited number of outcomes; that is, “even very complex systems tend to arrive at certain salient outcomes, and although we cannot predict in advance what these outcomes might be, when we see them we recognise them” (Dörnyei, 2014, p. 85). An example of such a limited number of outcomes that most teachers will be familiar with is the existence of different student types in every classroom (i.e., the emergence of a limited number of student profiles that both teachers and students will recognise as typical).

**Context**

As mentioned earlier, contextual factors can play such a prominent role in pushing or pulling a system toward or away from a certain state that some of them cannot be meaningfully separated from the dynamics of the whole system and, as such, form an integral part of the system. For example, if we look at the learning environment of a language classroom and focus on the behaviour of individual learners, their performance will be affected by various layers of contextual influences such as the behaviour of friends and classmates, the constraints of the classroom space, or the leadership functions exercised by the teacher. Thus, as explained by Verspoor et al. (2008), the learner and the environment are not independent of one another but rather influence and change each other, leading to systemic variability in development. Our challenge in researching the learner and the context is, thus, to “consider simultaneously the ongoing multiple influences between environmental and learner factors in all their componential complexity, as well as the emerging changes in both the learner and the environment as a result of this development” (Dörnyei, 2009a, p. 244, original emphasis). This mutual influence of learner and environment implies that, in order to understand the development of a dynamic system, we need to examine the phenomenon under study in its naturally occurring context, be it a structured ESL classroom (Larsen-Freeman, 2006), or a more unpredictable kindergarten playground (Van Geert & Steenbeek, 2005).

**MOTIVATIONAL DYNAMICS**

As well as having influenced the field of SLA as a whole, a complex dynamic systems approach has had significant influence on the understanding of L2 motivation. This understanding has undergone a transformation over the past decade; the days in which motivation was seen as a static
individual difference variable within a modular framework—the most famous of which being Robert Gardner’s (1985) socio-educational model—seem to belong to the past. As soon as motivation came to be seen as a situated construct during the *educational shift* in the 1990s (e.g., Crookes & Schmidt, 1991; Dörnyei, 1994; Williams & Burden, 1997), it was only a matter of time before one would arrive at the unavoidable realisation that motivation also has a prominent temporal dimension (i.e., it displays ongoing change). The first step toward a more dynamic conception of L2 motivation was the introduction of various *process models*. Examples of frameworks depicting motivation as a process include Williams and Burden’s (1997) theory, in which three different stages of motivation were distinguished: (1) the reason for doing something, (2) deciding to do something, and (3) persisting in doing something. Similarly, Dörnyei and Otto’s (1998) process model of L2 motivation differentiated between three phases in the development of a student’s L2 motivation: (1) a pre-actional phase, or *choice motivation*, in which motivation to initiate an activity is formed, (2) an actional phase, or *executive motivation*, in which the initial level of motivation has to be maintained during the learning activity, and (3) a post-actional phase, or *motivational retrospection*, in which the process is evaluated and lessons are drawn that affect subsequent motivation.

In hindsight, these frameworks were still based on linear cause–effect relationships—although the Dörnyei–Otto model also included several feedback loops—and it was gradually recognised that to account for the real dynamics of the L2 motivational process requires a more radical reformulation than merely designing increasingly complicated patchworks of interwoven cause–effect relationships. A highly instructive parallel in this respect has been offered by the evolution of emotion research, as exemplified by the transformation of the thinking of one of the leading scholars in the area, Klaus Scherer. Originally interested in the componential structure of emotions (for a review, see Scherer, 2001), Scherer became acutely aware of the changing nature of these components over time and called for the abandoning of “static state concepts,” suggesting instead that scholars “move from a domain oriented approach to a process oriented approach” (Scherer, 1993, p. 5). However, the interlinking of different functional systems, involving cognitive, affective, and motivational aspects, pushed his conceptualization one step further:

Unfortunately, neither our conceptual nor our methodological tool kits are adapted to dealing with systems of the degree of complexity exhibited by emotion processes. There is little hope of ‘repairing’ our concepts and methods in a piecemeal fashion in order to do justice to the phenomenon under study. Rather, we need a complete revolution in our thinking about the nature of emotion, comparable to other paradigm shifts in the history of science. In particular, we need to move from thinking in terms of discrete boxes, labels, or even neural programs to a nonlinear dynamic systems perspective of emotion. (Scherer, 2000, pp. 77, 80)

In view of the above considerations, a dynamic systems approach seems attractive in that it is able to accommodate explanations of both variability and stability without relying on cause–effect links. Accounting for fluctuation is a prerequisite to any further advance in our understanding of L2 motivation because of the salience of the change of motivation over time, the first of the three main features of a dynamic system as mentioned above. This change appears frequently in recent L2 motivation research. Hotho (2000) for example found that even when a learner’s overall L2 motivational profile remained relatively stable during a semester, short term motivation was susceptible to considerable change: “[T]he teachers may sense changes or fluctuations from week to week, as a result, perhaps, of a piece of homework, a test, or a class that was particularly inspiring or noninspiring” (p. 326). Similarly, Pawlak (2012) and Poupore (2013) traced the development of groups of learners for the duration of several classroom hours, and they, too, highlighted the dynamic nature of short-term motivation. Other investigations have documented long-term tendencies in motivational evolution, usually evidencing some decline in levels of motivation during the course of extensive institutional engagement (e.g., Chambers, 1999; Dörnyei, Csízér, & Németh, 2006; Gardner et al., 2004). These studies seem to suggest that motivation may fluctuate at different time scales that range from minutes to hours, days, months, or years. These time scales interact: What happens on the minutes scale has an impact on what happens on higher time scales and the other way around (for a discussion on time scales in language development, see de Bot, 2012).

On the other hand, the developmental variation observed in student motivation has also included occasional stable periods or predictable patterns, the second of the three main features of a dynamic system. For example, Koizumi and Matsuo (1993) found that after a sudden decrease
in motivation following the transition to junior high school, students’ motivation settled into an equilibrium. In a qualitative study examining motivational evolution over the lifespan, Shoaib and Dörnyei (2005) elicited a number of recurring temporal patterns and key transformational episodes affecting motivation, including for example transitions to new life phases (such as leaving school and entering the world of work) or the experience of visiting an English-speaking environment. To cite a final study that examined temporal variation and stability, this time in L2 learners’ willingness to communicate (WTC), MacIntyre and Legatto (2011) found not only variability in learners’ willingness to speak, but also a stable level, or attractor state, when the surrounding systems supported a learner’s WTC:

WTC shows the properties of a dynamic system. We see that there are changes over time wherein each state is partially dependent on the previous state. We also see the interconnectedness of the linguistic, social, cognitive and emotional systems that produce WTC. When the systems function together to facilitate communication, we see WTC as an attractor state. (MacIntyre & Legatto, 2011, p. 169)

Regarding the third of the three main features of a dynamic system—the importance of context in motivation research—advances have gone hand in hand with the more general social turn (Block, 2003) in SLA research that has characterised the past fifteen years (for a review, see e.g., Zuengler & Miller, 2006). The best-known motivation theory in this respect has been Ushioda’s (2009) Person-in-Context Relational View of Motivation, which, as the name suggests, highlights the agency of second language learners conceived as individuals who are located in particular cultural and historical contexts and whose motivation and identities shape and are shaped by these contexts. This environmental impact has recently been confirmed, for example, by Campbell and Storch’s (2011) study, which explored motivational fluctuation and change amongst university students learning Chinese as a foreign language over a semester. The authors found that factors related to the learning environment were the most important variables to impact motivation both in a positive and a negative sense (i.e., both motivating and demotivating). Furthermore, the dynamic relationship between learner and context was also confirmed by the finding that when learners had developed a clear future image of themselves as speakers of the L2, they were able to stabilise their motivational state, even in the face of demotivating contextual factors, by means of conscious self-motivation strategies.

In sum, the situated conceptualisation of L2 motivation and the subsequent process models proposed in the 1990s launched an ongoing progression of thinking that led to dynamic conceptions of motivational change. As a result, metaphorically speaking, the issue of motivational dynamics is currently in the air as one of the main themes to explore, as attested to by a high-profile colloquium under the same title at the 2013 annual conference of the American Association for Applied Linguistics and a subsequent anthology edited by the colloquium organisers (Dörnyei, MacIntyre, & Henry, 2014).

The question then remains: How does one study motivation from a dynamic perspective? The present study aims to illustrate the three aforementioned characteristics of a dynamic system, that is to say change, stability, and context, in language learners’ motivation. The research question is therefore threefold:

RQ1. Is there variability to be found in students’ in-class motivation?

RQ2. Is there a detectable stable level, or attractor state, in students’ in-class motivation?

RQ3. If there is indeed variability and stability in students’ motivation, can this be accounted for by the classroom context?

We endeavour to answer these research questions by utilising a range of data gathering methods and data types in a longitudinal classroom-oriented investigation that examined the motivational variability of young secondary pupils in two different language courses, German and Spanish.

METHOD

Study Design

In order to allow for intensive, individual-level microanalysis, four students (two males and two females) participated in the study. They were selected from a class of 28 students in their first year of the highest level of Dutch secondary education (referred to as pre-university plus, ages 11 to 12). A limit of four students was decided on to facilitate classroom observations of the participants. The number was thought to be sufficient since the aim of the study was not to study group averages but rather to focus on individual level analysis. The motivational variability of these
students was measured over a period of two weeks. This two-week time span suited the purpose of the study, namely micro-inspection of classroom motivation rather than changes over a longer period of time, considered the practical constraints of instruction, such as exams and bank holidays, and was deemed to be broad enough to tap into the micro-variation of motivation within a classroom session. Measurements of motivation were taken at five minute intervals during six language classes: three sessions of 45–50 minutes in the Spanish class and three sessions of 45–50 minutes in the German class. Classroom activities were observed and documented by the researcher present in the classroom for all six sessions. After the last session, students filled out a questionnaire on attitude and motivation toward both language classes and teachers.

The target languages were both compulsory foreign languages that are not typically taught at the primary school level. In secondary education in the Netherlands, German is commonly studied in this age group, whereas Spanish is normally an optional module. However, for this particular group of students, being taught at pre-university plus level, both languages were compulsory in the first three years of secondary school. Both courses were aimed at reaching the A1 level in the Common European Framework of Reference in a little under a year. The students received two hours of classroom instruction for each of the two languages each week, with the lessons typically lasting about 45–50 minutes.

Students were taught by their regular language teachers, both experienced teachers in their forties, who had taught at the school for several years. Although their teaching methods are typical in Dutch language classrooms, the teachers differed somewhat in the tasks they employed, the Spanish teacher being more traditional in any retrospective comments by both students and teachers. Language activities were described indicating their starting time and duration (to allow for matching them with the online motivation measures), and the researcher paid specific attention to noting down details concerning the unfolding lesson. Measurements took place, an observation form of motivation. At the end of the lessons the Motometers were collected by the researcher and, if necessary, clarifying questions were asked to explain striking variations in the data. An example of the Motometer can be seen in Appendix B. Whereas the original Motometer by Gardner and colleagues (2004) was used to take a single measure of students’ state motivation during four classes throughout the academic year, the current adaptation is designed to tap into the subtler variation of motivation within a lesson. The tool is straightforward and intuitive and, most importantly, can be used in the context of the classroom without disturbing the natural progression of the lesson. It is similar to Pawlak’s (2012) “motivational grid” (p. 257), which measured motivation with time intervals of five minutes on a 1–7 scale.

In order to account for the contextual influences of the language classroom in which the measurements took place, an observation form was used to keep a record of the unfolding lesson plan, the actual actions and tasks performed, and any retrospective comments by both students and teachers. Language activities were described during each classroom session of 45–50 minutes. Participants received an A4 size sheet of paper with ten Motometers: thermometer-shaped figures with a ‘0’ at the lowest and a ‘100’ at the highest point. Students were instructed to indicate their level of motivation by drawing a horizontal line on the next Motometer every time they were prompted to do so. This prompting was done in time intervals of five minutes by the researcher present in the classroom using a prerecorded soft bell sound. Motivation was defined as ‘How much effort do I want to put into learning the material right now’, and ‘How much do I enjoy this lesson right now’. On the bottom of each page, a comments section allowed the participants to elaborate on their reported levels of motivation.

Appendix A gives an overview of classroom activities used across the six lessons.

**Instruments**

Three instruments were used to measure the participants’ motivation and to record ongoing observations of the classroom environment: a ‘Motometer’, a classroom observation form, and a motivation/attitude questionnaire. Following the example of a longitudinal classroom study by Gardner et al. (2004), the Motometer was introduced to take a series of ten online (i.e., real time) measurements of student motivation during each classroom session of 45–50 minutes. Participants received an A4 size sheet of paper with ten Motometers: thermometer-shaped figures with a ‘0’ at the lowest and a ‘100’ at the highest point. Students were instructed to indicate their level of motivation by drawing a horizontal line on the next Motometer every time they were prompted to do so. This prompting was done in time intervals of five minutes by the researcher present in the classroom using a prerecorded soft bell sound. Motivation was defined as ‘How much effort do I want to put into learning the material right now’, and ‘How much do I enjoy this lesson right now’. On the bottom of each page, a comments section allowed the participants to elaborate on their reported levels of motivation. At the end of the lessons the Motometers were collected by the researcher and, if necessary, clarifying questions were asked to explain striking variations in the data. An example of the Motometer can be seen in Appendix B. Whereas the original Motometer by Gardner and colleagues (2004) was used to take a single measure of students’ state motivation during four classes throughout the academic year, the current adaptation is designed to tap into the subtler variation of motivation within a lesson. The tool is straightforward and intuitive and, most importantly, can be used in the context of the classroom without disturbing the natural progression of the lesson. It is similar to Pawlak’s (2012) “motivational grid” (p. 257), which measured motivation with time intervals of five minutes on a 1–7 scale.

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The four students’ overall L2 motivational profile was ascertained through a questionnaire containing 27 10-point Likert scale items; it measured students’ attitudes toward both language courses, with scores ranging from ‘completely disagree’ (1) to ‘completely agree’ (10). Seventeen questions were related to the
students’ attitudes toward the course, including seven items on enjoying the language classes in general (e.g., ‘Sometimes at the end of German class I would like to continue’), seven items on linguistic self-confidence (e.g., ‘I feel like I’m making progress with German’), and three items on classroom anxiety (e.g., ‘I’m afraid my classmates will laugh at me when I make a mistake’). The last ten questionnaire items were related to the students’ attitude toward the language teachers who taught them. To complete the students’ learner profiles, teachers reported on the participants’ overall grades in both courses (German and Spanish) at the end of the semester, which involved composite scores of several proficiency tests taken during the course. In this school, students take several tests varying in length from 10 to 60 minutes throughout a semester. At the end of each semester, a student’s final grade for a course will be the average of the four to five tests taken. These tests focus mainly on written translation from and to the target language and reading and listening comprehension, skills that are also the main focus of the classroom sessions and are typical in Dutch language classrooms at this level.

Participants

After four lessons of classroom observation by the first author and a brief consultation with both language teachers, four students were asked to participate in the study. The main selection principle was to have a mixture representing the class composition: Student 1, Boris, is what most teachers would describe as a good pupil: He usually pays attention and generally knows the answer to the teacher’s questions. Student 2, Connor, is easily distracted but asks for clarification when something is not clear to him. Student 3, Nina, is actively participating, needs a lot of confirmation and therefore asks many questions (unfortunately, during the investigation she had a brief case of the flu that made her miss some classes). Student 4, Irene, has mastered the art of doing other things in class without being noticed. She pays attention when necessary, but does not participate unless asked to. Table 1 offers an overview of each participating student; Figure 2 in the Results and Discussion section adds to this characterisation by presenting summaries of the attitudinal scale scores of the questionnaire data.

Procedures and Data Analysis

The first lessons observed in both subjects were treated as pilot lessons so that students could learn to apply the Motometer and the whole class could get used to hearing the bell sound. Following these initial sessions, data were gathered over a period of two weeks using both the classroom observation form and the Motometer in three lessons of Spanish and three lessons of German. Students were then given two copies of the questionnaire—one for their German class and one for their Spanish class—and were asked to fill them out at home.

In the analysis of the data, first the Motometer data were documented by the first researcher as follows: The distance between the bottom of the Motometer and the line drawn by the student was measured in millimetres and converted to a 1–100 numeric scale. Using Excel, the data points for each lesson were listed per participant. For each of the lessons, the Motometer data were then entered into a graph, resulting in six separate graphs, three for German and three for Spanish, showing the motivational variability of the four students simultaneously. In these graphs, time was represented on the horizontal axis in steps of five minutes. The vertical axis showed the students’ level of motivation according to the Motometer on a 1–100 scale.

Second, the classroom observation data were coded and placed into two categories by the first researcher: the more general ‘classroom activity’ category on the one hand, and ‘episodic instances’ on the other. The observations in this first category, classroom activity, focused on the overall structure of the lesson and activities such as ‘teacher explains the use of past tense’, and ‘students work in pairs on grammar exercise’. The observations in the second category, episodic instances, were shorter in length and included instances such as ‘teacher tells class off for being too noisy’. Episodes involving one of the four participants were also included in this category, such as ‘teacher helps out Connor with the exercise’ and ‘Boris is chatting with his friend’.

Next, the first researcher combined Motometer data and observational data in so-called composite charts. In these charts, the Motometer data of all four participants were plotted against the observational data, which were organized underneath the horizontal axis. Furthermore, the written comments some participants provided on their Motometers, elaborating on their motivation at a given moment, were added underneath the observational data. The combined observational data and students’ comments provided an online context for the Motometer data. An example of a composite chart is provided in the results section.
Finally, the first researcher used written observations of the participants’ behaviour in class and their average grades on both subjects to draw up a student profile for each of the four participants as shown in the Participants section of this article. The results of the motivation/attitude questionnaires were analysed in Excel and used to draw up an attitude profile for each of the participants. This will be presented in the following section.

**RESULTS AND DISCUSSION**

**Composite Charts**

The various data gathering procedures generated a considerable amount of information over the six observed lessons. As previously described, six large composite charts were prepared (one for each class) to map the Motometer data against the various pieces of contextual information. Figure 1, also reproduced on the Web page in the online version of the journal, offers an illustration taken from the Spanish course. As can be seen, the horizontal axis represented time in steps of five minutes. Underneath the axis, the first level of activity blocks indicated the events making up the class content (e.g., ‘teacher explains the use of past tense’, ‘students work on their assignment in pairs’). The second level presented classroom observational comments (e.g., ‘student 1 is chatting with his friend’, ‘teacher helps Irene individually’, and ‘teacher gets annoyed and demands silence’); these comments referred to episodic instances rather than blocks of activities, and can be linked to specific points in the lesson. The rest of the boxes contained comments provided by the students on the Motometer at specific measurement points. Unfortunately, due to space limitations, we can only illustrate this combined data source in one chart in Figure 1, and even that cannot contain all the original formatting and colour-coding features. Therefore, in the following discussion, subsets of the overall data display charts will be presented in smaller, separate graphs. (The full-colour version of Figure 1 is available in the online version of this article.)

**Student Profiles**

The questionnaire data combined with classroom observation notes were used to construct individual profiles for the four participants. The main function of these profiles was to help to explain or clarify some aspects of the motivational dynamics observed. An overview of the learners’ salient characteristics, overall classroom behaviour, and learning achievements was already offered in Table 1 in the Participants section. This characterisation is further augmented by Figure 2, which presents questionnaire scale scores on the students’ reported enjoyment in class, their confidence in their language learning abilities, classroom anxiety, and attitudes toward the language teacher. Each of these is represented on a 1–10 scale; a higher score indicates more enjoyment, confidence, and anxiety, and a more positive attitude toward the teacher. The profiles highlight several differences in the students’ overall attitudes toward the German and Spanish courses. We should note here that although the data displayed in Figure 2 come from a quantitative measure, because of the low participant number it has been interpreted in a qualitative manner.

<table>
<thead>
<tr>
<th><strong>TABLE 1</strong> Student Profiles</th>
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<tbody>
<tr>
<td><strong>Student details</strong></td>
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<tr>
<td><strong>Boris</strong> Gender: M Age: 12</td>
</tr>
<tr>
<td><strong>Connor</strong> Gender: M Age: 11</td>
</tr>
<tr>
<td><strong>Nina</strong> Gender: F Age: 11</td>
</tr>
<tr>
<td><strong>Irene</strong> Gender: F Age: 12</td>
</tr>
</tbody>
</table>
FIGURE 1
Composite Data Display Chart

FIGURE 1
Composite Data Display Chart

All Students, Spanish Class 3

Time in steps of 5 minutes

Teacher announces test at the end of the lesson and explains the end of the lesson. The test is over, and the students can leave the classroom. The teacher explains the basics of colours in Spanish, and announces an exercise to practice them. The teacher repeats some of the student's questions and gives a correct answer. The teacher tells student 3, "you're in excellent form today." The end of the lesson, handing in of papers, wrapping up of the exercise: One of the students disrupts the lesson and is placed in the corner. We can still practice (for the test) making these sentences. Just translating sentences is no fun at all. Only one more hour and this school-day is over! This lesson is over. Only one more hour and we're free for today.
manner, as part of the students’ profiles. To highlight the most salient patterns, three of the four students show a preference for Spanish over German, and in one student’s case (Boris) there is a striking disparity between his disposition toward Spanish and German. Only Connor has a more positive attitude toward German than Spanish.

Change and Variability

The findings reveal a considerable amount of individual variability in the four students’ motivation. To illustrate this, Figures 3 and 4 present the motivational development of the participants during a German lesson (Lesson 3), with the data charted both at the group and the individual levels. Figure 3 displays a relatively straightforward pattern: The overall group motivation shows a steady increase from a relatively low level (30/100) to a moderately high level (60/100), with a small final decline. However, the individual level trajectories in Figure 4 do not reflect this pattern in any of the four students’ motivational progression: Here we can see dramatic ups and downs, and only two of the participants, Connor and Nina, actually gain motivation during the lesson. Boris seems to be rather unmotivated during the whole lesson, whereas the progression of Irene’s motivation shows an increase followed by a decrease and another increase, suddenly ending in a decrease. These findings are in full
accordance with Larsen-Freeman’s (2006) results, whereby none of the individual students examined displayed the pattern indicated by the group average.

Some of the variability observed in this lesson can be explained by contextual factors: Irene (with a partner) was asked to act out a written ‘restaurant scene’ between Minutes 17 and 22, which was followed by playing a vocabulary game, starting at Minute 27. Irene’s motivation before the game showed variability because she was asked to perform in front of her classmates, during which time some of her friends were giggling repeatedly. The subsequent game seemingly helped to increase her motivation, along with Connor’s and Nina’s; however, this positive impetus did not seem to affect Boris, who had the lowest level of overall attitudes toward German of the four students (see Figure 2). Interestingly, Irene’s motivational profile is the second lowest regarding German and Connor’s is the highest, which seems to be in accord with their motivational state in this class. These observations point toward a tentative conclusion that someone’s generalised attitude toward a language may act as a higher order attractor (i.e., functioning on a higher time scale) that affects the situated fluctuation in classroom motivation, but this effect is far from uniform and fully predictable: In Boris’s case it resulted in a general disinterest and indifference, while in Irene’s and Connor’s cases it affected the general level of their motivational intensity without altering the directions and the scope of the fluctuation. Thus, we can say that, while Irene and Connor responded to the stimuli in a proportionate manner within their overall motivational range, Boris’s response was nonlinear as it did not reflect the positive impact of the game.

Although the moderating effect of a higher order attractor can make the data more predictable, some of the motivational variability among the participants remains complex. This is well illustrated by the fact that students who show similar motivational patterns in one lesson can be each other’s opposites in another. An example of this is given in Figures 5, 6, and 7, which compare Boris’s and Connor’s motivational progression in three lessons. Figure 5 shows a contrasting pattern: Boris was losing while Connor was gaining motivation throughout a Spanish lesson, which is in fact contradictory to their Spanish motivational profile (Boris is superior to Connor by a large margin). It appears that here the starting point—that is, the initial condition—of system behaviour played a significant role: Boris’s initial motivation at the beginning of the lesson was close to maximum, and even after the decline it still exceeded Connor’s, whose upward trend in this class started from a rather low motivational level. Then, in Figure 6, we find a virtually identical motivational development for the two boys in a German lesson, whereas when we look at Figure 7, taken from another Spanish lesson, it is hard to imagine that the two boys were attending the same class. Another telling illustration of between-participant variability is a comparison of Nina’s and Irene’s cases. According to Figure 2, they share fairly similar motivational profiles in both languages, but this similarity is not reflected in corresponding motivational reactions in the actual language lessons. As can be seen in Figure 8, they can react in the opposite way: Recall that this was the lesson in which Irene was asked to perform a little act in front of everyone, which explains partly, but not fully, why the two girls had a completely different classroom experience.
Finally, in addition to variation among the different participants, the data also showed within-participant variation. A good example of the latter type of variation is provided by a closer inspection of Irene’s motivational development. Looking at Figures 9 and 10, which chart her motivational change in Spanish and German, respectively, the dominant pattern appears to be a moderate and gradual increase in motivation, without any sudden increases or decreases. However, during the last lesson of German and the last lesson of Spanish, her motivation deviated considerably from this pattern shown in previous lessons. Regarding the German lesson, the plummeting motivation may still be related to the acting fiasco described earlier; as for the sharp rise in the Spanish class, it might be relevant to note that this particular lesson took place on a Friday afternoon and Irene commented at the end of the lesson (see Figure 1): “This lesson is over. Only one more hour and we are free for today!”

Stability

One important lesson that we can draw from the data is that change is not always random or unpredictable and even group averages may not always be misleading. First of all, in several lesson phases the group-level data and the individual trajectories showed remarkable similarities, as can be seen, for example, in Figures 11 and 12, representing motivational development in the middle section of a Spanish lesson (Minutes 10–30). The pattern of decline → increase → increase → decline is uniform among all four participants and thus coincides with the group-level trajectory. According to DST, such a commonality within a multicomponential system such as a language class indicates the influence of a strong attractor; in this particular case the accompanying contextual information reveals that the increase in student motivation can be linked to a change in classroom activity: After a lengthy explanation related to the
next test (which dampened motivation), the teacher introduced an engaging listening exercise in Minute 22, resulting in increased motivation, which was also confirmed by student comments (e.g., the very short but clear note by Connor: “Listening-exercise: nice!”). We can gain further insights into the relationship between stable/predictable and variable/unpredictable phases of classroom learning when we look at the motivational progress that preceded and succeeded the attractor-governed central phase of the Spanish lesson discussed above. Figure 13 presents the four participants’ motivational development at the beginning and at the end of the Spanish lesson described in Figures 11 and 12. As we can see, in these framing phases, students experienced highly varied motivational states: In the beginning, two of them displayed increasing, the other two declining trajectories, which were then unified by the listening activity that acted as a strong attractor. When this activity came to an end, in the absence of any powerful attractor-based regulation (in this case, the listening activity), the students once again started to show disparate patterns of motivational development. Figure 13 shows four very different patterns for the four students during the last 10 minutes of the lesson (rise, fall, rise–fall, and fall–rise). One reason for this before-and-after diversity is likely to be related to the influence of pre-lesson events at the beginning of class—good teachers are usually aware of the need to pull the...
students together with some ‘warmers’—as well as the anticipation of lessons or activities that were to follow the class. This highlights the importance of the temporal context of language lessons.

Apart from any observable uniformity across participants, we also find a certain amount of stability within the students’ own dispositions. The most striking example of this is Boris’s motivation during Spanish classes. As can be seen in his profile in Figure 2, his attitude toward Spanish is extremely positive. This echoes in all his motivational data gathered through the Motometer: While in Figures 14, 15, and 16 we can see how his motivation is still susceptible to variation, this happens at a different level from the fluctuation observed in the other students. That is, in spite of his very high general motivation to learn Spanish, Boris still has motivational ups and downs, but the overall picture shows a much higher level of motivational engagement than for Connor, Nina, and Irene. One of his comments written on the Motometer sheds important light on this issue: “I like learning Spanish, also because of Mr. Seran [the teacher]. That’s why the Motometer-score is so high all the time” (Spanish lesson 1). This comment confirms a key tenet of classroom reality: Teachers have a salient classroom role by definition, allowing them to become powerful motivational attractors (or repellents).

Context

As we have seen in the previous examples, information about the classroom context is essential in uncovering factors that affect motivational variability. Some of the more pronounced contextual influences, such as those pertaining to the language learning tasks or the students’ generalised attitudes toward the language (potentially caused by their teachers), have been mentioned earlier. Other influences are not so obvious or easy to identify, as shown in the following examples. To start with, in Figure 17 we can see the motivation of Nina and Irene during a lesson of Spanish. Both girls reported a substantial increase in their motivation toward the end of the lesson which did not seem to be related to the lesson content. When asked to explain this sudden change they confirmed—separately from each other—that the reason they reported more...
motivation was: “Only one more hour and this school-day is over!” (Nina, Spanish lesson 3). As mentioned earlier, the fact that the class in question was on a Friday afternoon will most likely have been a factor in this shared enthusiasm, which reiterates the significance of the temporal context and also opens up the classroom space beyond the actual classroom walls.

In Figure 18 we see another example of the importance of context, in this case for Connor. At first his motivation is rising steadily to about 70/100, only to suddenly drop to 40/100. At first glance the decreasing motivation could be attributed to anxiety caused by an oncoming test, starting just after Minute 40. However, additional observational data—Connor seemed to be sad and crying—and his subsequent comments show a different picture. What happened was not language-related at all: While distributing dictionaries, one of the students threw a dictionary to the table of Connor and his friend. However, his friend didn’t catch the book in time and it hit Connor’s head instead, causing him to cry and lose motivation. After the test he commented, “I did well on the test!” which explains his surge in motivation.

CONCLUSION

This study utilised real-time assessment of classroom motivation, charting the progression of four selected learners’ dispositions at five-minute intervals. To answer our first research question of whether there is variability to be found in students’ in-class motivation, the results provided a clear illustration that student motivation is susceptible to variation even on a rather short time scale: We have observed considerable ups and downs and shifts within the learners’ motivational state within a single classroom session of 45–50 minutes, even if the time frame of the study only spanned two weeks. Confirming the findings of Larsen-Freeman’s (2006) investigation, our study showed that averaged group data can often be insufficient to capture the variation in individual learners’ development: In some of the lessons examined, the trajectory of the group data did not coincide with any of the student’s individual trends, which was best illustrated by a case when the learners as a group showed a steady increase in their motivation whereas half of the students actually experienced a decline. In other cases, however, a grand sweep of the data did offer a fair representation of what was going on. Our findings showed that the instances when all the participants reacted in a similar manner were associated with powerful attractor states: Certain contextual factors constituted a strong enough force to regulate disparate system behaviour. To recognise these attractor states and identify the most frequent sources would be a helpful tool for teachers to enhance and maintain learners’ in-class motivation.

To answer our second research question concerning detectable stable levels, or attractor states, in students’ classroom motivation, the results showed that even over a time span of just two weeks we could indeed detect a rather stable level of overall motivation, of which Boris’s overall highly motivated state in Spanish class is the clearest example. We also presented evidence of a likely regulating influence, namely a student’s overall liking of the subject matter, such as, in Boris’s case, a very positive attitude toward learning Spanish. For Boris, this predilection was traced back to his positive attitudes toward the Spanish teacher, and it resulted in a generally more positive engagement with classroom activities. However, it was noteworthy that the trajectory of system behaviour was also dependent on the initial condition of the system: One telling example was when Boris’s negative and Connor’s positive motivational trajectories in a lesson were contradictory to their overall language preferences and could be explained by the initial motivational level with which they entered the particular language lesson. Taking into account what was shown earlier on in Figure 15, where the activity following the current lesson influences students’ motivation in class, we suggest that the events prior to the lesson can similarly affect students’ (initial) motivation during their lesson. Given that the initial level of motivation can be of considerable importance, findings like these reiterate that it is vital for teachers to invest at the beginning of a classroom session, either using
a warm-up activity, or simply by making a point of having everyone’s attention at the beginning of the lesson, something that was not always done in the sessions observed in this study.

So far, in line with the principles of DST, our main finding was that regulated and seemingly stable phases of the students’ behaviour alternated with seemingly erratic reactions. With respect to our third research question on the importance of context, sometimes these latter reactions could be attributed to specific classroom episodes (e.g., a dictionary hitting a student’s head) or could be explained by retrospective comments such as an unexpected increase in two students’ level of motivation which turned out to be related to the joy of realising that it was Friday afternoon and freedom was near. These instances served as evidence for the close, inextricable link between context (both spatial and temporal) and system behaviour, confirming the fundamental DST tenet that the immediate context is best perceived as part of the overall system. On the other hand, in some cases even powerful regulating forces such as the introduction of an engaging listening exercise did not have a proportionate impact on all the students, which was in accordance with the DST principles of nonlinearity in system behaviour.

Thus, the overall picture we obtained from our micro-inspection of classroom motivation is that of a mixture of dynamic stability, governed by attractor states, and individual variability, caused by a combination of multiple issues. The variability can sometimes—but not always—be accounted for by specifics in the situation if we consider a wide enough range of potentially interrelated factors, but in some cases no obvious reason may be forthcoming. Furthermore, even if we can identify certain powerful contextual influences, they may have a disproportionate—that is, nonlinear—impact on the learners’ behaviour. While all this may sound rather confusing, such a mixed picture of partial order and partial chaos is in fact not too far from many language teachers’ perceptions of what classroom reality is really like. Therefore, we would suggest that a dynamic system perspective offers a suitable lens for examining classroom phenomena in their richness.

Implications for language teachers include, as mentioned before, the importance of the start of a lesson and pulling the students together with some ‘warmers’. Another piece of advice that can be drawn from this study is for teachers to become aware of the forces in their classrooms that can function as a push and pull strong enough to create an attractor state in the students’ motivation, either negative (such as a long grammar explanation) or positive (such as the introduction of a vocabulary game). A final more general point to take away for both teachers and learners is the article’s overarching argument that in-class motivation is by no means a stable trait. As most language teachers are generally aware, while a certain group of learners or an individual learner may display a higher or lower level of motivation overall, their motivation in the language classroom is still susceptible to change. The most motivated student can lose interest after half an hour of grammar explanation and be in need of a motivational boost, while a student who generally seems to be unmotivated can suddenly become engaged in a new task. These two levels of motivation most likely interact with one another constantly. Indeed, this motivational variability within a classroom session may help shape students’ overall L2 motivation. Therefore, this variability itself and the extent to which the teacher has influence over it most certainly matters.

Our study has its limitations. First of all, it has been conducted with a limited number of participants: Data from a larger sample of students for a longer period of time undoubtedly would provide more insights into the existence of possible attractor states and into the relationship of motivational development at an individual and a class/group level. We must also bear in mind that the learners in this study were relatively young; older teenagers will have developed further meta-motivational maturity to regulate the incidental ups and down of their situated disposition. Finally, the data in this study were gathered by a single researcher, the first author, and the study’s reliability would likely have been enhanced by another pair of observing eyes. Despite these limitations, we hope to have shown that using a relatively straightforward and common-sense methodology that is based on the principles of DST can uncover layers of the dynamic processes influencing student motivation that otherwise would have remained hidden. The present article was not intended to offer a comprehensive treatment of all these layers. Instead, its aim was to offer convincing illustrations of the fact that documenting various motivational pushes and pulls in a dynamic systems vein can identify relatively stable—and thus potentially researchable and manipulable—attractor and repellent states. This results in the possibility of modelling student behaviour at an enhanced level of reality.
NOTES

1 Although lessons officially lasted 50 minutes, since students had to move from one classroom to another in between lessons, the teaching time ranged from 40 to 45 minutes, depending on how long the teacher took to start the lesson.

2 All participant and teacher names have been changed.

REFERENCES


APPENDIX A

Classroom Activities in the Observed Language Lessons

### TABLE A1

**German Lesson 1**

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–7</td>
<td>The teacher explains the schedule for the next few weeks and students and teacher decide on the dates for two upcoming tests. The teacher talks about the books students will read and a film they will watch.</td>
</tr>
<tr>
<td>7–17</td>
<td>Students receive the results of their latest proficiency test and are given the opportunity to reflect on their answers and ask questions.</td>
</tr>
<tr>
<td>17–27</td>
<td>The teacher and students together go over the homework, checking students’ answers and adding explanations where necessary.</td>
</tr>
<tr>
<td>27–37</td>
<td>New exercise: Students are given a list of items for which they don’t know the German translation, and practise describing the items using the target language, gestures, and sounds. After students have described all the items in pairs, the teacher asks some students to give their description to the class.</td>
</tr>
<tr>
<td>37–39</td>
<td>Students start working on a second task individually. They translate sentences similar to the ones used in the previous task, describing common objects.</td>
</tr>
<tr>
<td>40</td>
<td>End of lesson, teacher gives homework.</td>
</tr>
</tbody>
</table>

### TABLE A2

**German Lesson 2**

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–8</td>
<td>Students are given three minutes to complete the unfinished task from the last lesson. Afterward, students and teacher correct the task together.</td>
</tr>
<tr>
<td>8–10</td>
<td>The teacher returns an assignment the students had handed in a week earlier: a restaurant-themed play they had written in pairs. Two students are asked to perform their play next week.</td>
</tr>
<tr>
<td>10–41</td>
<td>The teacher introduces a new vocabulary game: Each student receives eight empty flashcards. On one side they write Dutch words, on the other side the German translation; they win a card every time they translate it correctly. The game is slightly chaotic; students have fun but don’t always follow the rules.</td>
</tr>
<tr>
<td>41–42</td>
<td>Teacher ends the game and asks students for feedback. She gives homework for next week and dismisses the class.</td>
</tr>
</tbody>
</table>
### TABLE A3
**German Lesson 3**

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–5</td>
<td>Teacher checks students’ understanding of the text they had to read as homework. She explains the use of cases in German to answer a student’s question.</td>
</tr>
<tr>
<td>5–13</td>
<td>The teacher answers grammar questions that students have concerning the use of ‘wen’ and ‘wer’ and the use of gender in German.</td>
</tr>
<tr>
<td>13–18</td>
<td>Two students act out their restaurant scene as agreed upon in the last lesson. The teacher gives them some feedback.</td>
</tr>
<tr>
<td>19–21</td>
<td>Teacher explains a new vocabulary game similar to the one they did in the last lesson. Students are asked to vote for either playing the game or practicing their restaurant scenes: The majority chooses the game.</td>
</tr>
<tr>
<td>21–40</td>
<td>The teacher distributes flashcards with new vocabulary, students form groups of three or four to play the game. The rules are similar to that of ‘Quartet’, a Dutch card game.</td>
</tr>
<tr>
<td>40</td>
<td>End of class, teacher collects flashcards and gives homework.</td>
</tr>
</tbody>
</table>

### TABLE A4
**Spanish Lesson 1**

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–6</td>
<td>The teacher starts with a grammar explanation of the use of ‘muy’ and ‘mucho’.</td>
</tr>
<tr>
<td>6–17</td>
<td>The teacher dictates examples, students copy them in their books.</td>
</tr>
<tr>
<td>17–21</td>
<td>Students ask another question about the grammar explanation, the teacher explains.</td>
</tr>
<tr>
<td>21–32</td>
<td>The teacher dictates sentences for the students to translate into the target language. Students copy them in their books and start translating in silence.</td>
</tr>
<tr>
<td>32–37</td>
<td>Teacher and students check and correct students’ translations together.</td>
</tr>
<tr>
<td>37–40</td>
<td>Teacher refers back to homework from last week and asks students to name colours in Spanish.</td>
</tr>
<tr>
<td>40</td>
<td>Teacher gives homework and dismisses class.</td>
</tr>
</tbody>
</table>

### TABLE A5
**Spanish Lesson 2**

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–14</td>
<td>Teacher announces and sets date for the upcoming test. He goes through the vocabulary and the grammar that will be tested.</td>
</tr>
<tr>
<td>14–18</td>
<td>Teacher answers questions about the material covered in the test.</td>
</tr>
<tr>
<td>18–25</td>
<td>Teacher asks students to name colours in Spanish.</td>
</tr>
<tr>
<td>25–39</td>
<td>Listening exercise: Students listen to several short recordings and answer pre-set questions.</td>
</tr>
<tr>
<td>39–42</td>
<td>Teacher explains the grammar of ‘muy’ and ‘mucho’.</td>
</tr>
<tr>
<td>42</td>
<td>Teacher gives homework, end of class.</td>
</tr>
</tbody>
</table>

### TABLE A6
**Spanish Lesson 3**

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>The teacher announces a short test that will take place at the end of the lesson and explains the structure of the test (eight sentences to be translated).</td>
</tr>
<tr>
<td>4–23</td>
<td>Students work on a task individually; they have to make up their own sentences describing an object and giving it a colour. They are allowed to use a dictionary.</td>
</tr>
<tr>
<td>23–36</td>
<td>Teacher and students check and correct students’ answers to the previous task. Students are given the time to ask some last questions before the test.</td>
</tr>
<tr>
<td>36–45</td>
<td>Proficiency test.</td>
</tr>
<tr>
<td>45</td>
<td>End of test, teacher wraps up lesson and class is dismissed.</td>
</tr>
</tbody>
</table>
APPENDIX B

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?

Comments:

• . . .
• . . .
• . . .