Fluctuations in Work Motivation: Tasks do not Matter!

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RUNNING HEAD: Fluctuations in work motivation

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Abstract: Previous studies have shown that work motivation fluctuates considerably and in a nonlinear way over time. In the present research, we are interested in studying if the task at hand does or does not influence the presence of these fluctuations. We gathered daily registers from 69 workers during 21 consecutive working days (7036 registers) of task developed and levels of motivation, self-efficacy beliefs and instrumentalities perception. These registers were then categorized into a list of labor activities in main tasks and subtasks by means of three judges with a high level of agreement (97.47% for tasks, and 98.64% for subtasks). Taking the MSSD statistic (mean squared successive difference) of the average of motivation, self-efficacy and instrumentality, and using hierarchical regression analysis we have found that tasks ($\beta = .03$; $p = .188$) and subtasks ($\beta = .10$; $p = .268$) do not affect the presence of fluctuations in motivation. These results reveal instability in work motivation independently from the tasks and subtasks that the workers do. We proceed to find that fluctuations in work motivation show a fractal structure across the different tasks we do in a working day. Implications of these results to motivational theory will be discussed as well as possible explanations (e.g. the influence of affect in work motivation) and directions for future research are provided.

KEYWORDS: work motivation, task, fluctuation, fractal structure.

INTRODUCTION

Recent research has addressed work motivation from a dynamic point of view by investigating how motivation evolves over time. Furthermore, researchers have followed recommendations that different authors have previously mentioned to further progress in the theory of work motivation in relation to the incorporation of a temporal perspective (Donovan, 2001; George & Jones, 2000; Steers, Mowday, & Shapiro, 2004), and the study of intra-individual differences (Dalal & Hulin, 2008; Kanfer, Chen, & Pritchard, 2008a). The aforementioned studies have considered temporal evolutions and provided empirical evidence that work motivation behaves nonlinearly (Navarro, Arrieta, & Ballén, 2007) and chaotically (Ceja & Navarro, 2011; Guastello, Johnson, & Rieke, 1999, Navarro & Arrieta, 2010).

However, what does it mean that work motivation shows nonlinear and chaotic behavior? And, what does this research contribute to the well renowned knowledge in motivational theory? According to the research carried out, both qualities (nonlinearity and chaos) refer to common properties of the so-called complex systems (Munné, 2005; Waldrop, 1992). And both properties reveal a picture of motivation as a more unstable phenomenon than classic motivational theories had thought. That is, work motivation would be a process that would present high irregularity and fluctuations over time, an aspect that has hardly been part of the research agenda in the area.

In this paper we present an investigation in which we have studied (a) whether it is true that work motivation shows instabilities and fluctuations over time, and (b) if such instability remains across different scales when taking into account the diversity of tasks that make up the work of one worker. Having said this, we hope to deepen in the chaotic and fractal nature of work motivation that the studies mentioned above have begun to show. For doing this, we will organize this introduction as follows: first, we will explore how time has been considered in organizational research; second, we will analyze the

nonlinear dynamics and chaos found in work motivation in several previous studies; and finally, we will conclude with the hypotheses that we think will grant continuity to the current literature.

TIME AND ORGANIZATIONAL BEHAVIOR

Time is, or should be, a key element in organizational behavior research. This is because many of the topics discussed in the organizational behavior field are processes, that is, constructs in which time is key as was pointed out by Katzell (1994, p. 8) when he argued that "paying more attention to consistencies and changes over time contributes to a better understanding of various subjects of interest, and thereby to more effective ways of dealing with them." Thus we speak of the emergence of leadership, the development of the organizational climate, the conflict escalation or de-escalation, decision-making processes or, in our area of interest, work motivation as a series of cognitive processes (expectancies, justice, self-efficacy, goals, etc.) which *taking* place in the mind of the person.

To this we would expect in the psychological literature on organizational behavior that temporal issues would occupy a prominent place. And it is true that time has been considered as a variable repeatedly included in the investigation. For example, considering the contributions included in the work edited by Cooper and Rousseau (2000), it has been theorized and researched on experiences about the time in the professionals and managers, on the influence of part-time or full time jobs, on cultural influences about the conception of time on career transitions, or the malleability of identity over time. Also the field of work motivation has studied, for example, the importance of time in equity theory (Cosier & Dalton, 1983), the importance of goal setting deadlines for compliance (Locke & Latham, 1990), the existence of phases that show different influences of the motivational and cognitive aspects in goals (Heckhausen, 1991), the influence of time orientation for the future in goals setting (Seijts, 1998), or the influence of organizational and social transitions on motivation (Konrad, 2000), to name a few of investigations.

However, recently a certain school of thought has emerged that believes that such treatment of temporal issues is not entirely adequate nor does it cover nuclear aspects of time as a key element in the development of theories and conducting research in organizational behavior. In this sense it comes into being a substantial literature (Dalal & Hulin, 2008; George & Jones, 2000; McGrath & Tschan, 2004, Mitchell & James, 2001; Roe, 2005a, 2005b; Zaheer, Albert, & Zaheer, 1999) that has emphasized that this consideration, mainly with a focus in epistemological issues, has hardly been considered in the research agenda. In this regard it is very instructive, for example, the title that Stephen Worchel gave to his review of the book mentioned above written by McGrath and Tschan: *It is time to include time in the study of social behavior* (Worchel, 2004).

What has the new literature added to the above consideration of temporal aspects? Fundamentally this line of thought has considered time from an epistemological approach, i.e. time as inseparable from the understanding of individual, organizational or social behavior. This approach is different from the above consideration of time as a variable. Now time is not a variable but an inherent element in understanding the behavior itself. From this position it is considered that the time involves the scientific work in different domains (McGrath & Tschan, 2004). For example, in the conceptual domain time is involved because research is concerned with cause-effect relationships, concerned about the study of evolutionary processes, etc. In the substantive domain, time is involved because research deals with types of empirical information that is collected in research designs (cross-sectional, longitudinal, etc.). And in the methodology domain, time is again involved because research also deals with how we can process this information (data analysis that is possible).

In our view, the studies that have found instability in work motivation (Ceja & Navarro, 2011; Guastello et al., 1999, Navarro & Arrieta, 2010, Navarro et al., 2007) precisely have included time in the conceptualization of motivation to give attention to its dynamical nature, including time in the

research design by using longitudinal approaches and in the analysis techniques by means of time series analysis.

It is significant that in doing the latter (the analysis of time series), researchers have opted for the use of analytical techniques based on complexity science and chaos theories. Such techniques are also able to capture possible regular and linear behaviors. For instance Navarro and Arrieta (2010) found that 5% of participants showed linear patterns in their work motivation. This leads us to go into more detail aboutwhat is meant by nonlinearity and chaos when it is applied to the understanding of work motivation.

NONLINEARITY AND CHAOS IN WORK MOTIVATION

As stated earlier, nonlinearity and chaos refer to common properties of complex systems. In particular, nonlinearity refers to the lack of proportionality between cause and effect so that it may cause a priori so small it could trigger large effects. In the present case this means that work motivation is affected by causes in a way that is not always proportional. Regarding chaos, this refers to sensitivity to initial conditions, meaning that two systems with similar starting conditions follow not necessarily the same evolution over time. In motivational terms this means, for example, that a motivational technique that has been previously applied successfully with a person or organization can trigger very different effects on other people or organizations, although both situations were very similar and the same technique was applied in the same way. Nonlinearity and chaos are properties that can be revealed with the use of time series analysis and application of some statistical analysis from complexity science and chaos theories such as recurrence plots, Lyapunov exponents, correlation dimension or the use of surrogate data (see Heath, 2000).

A further aspect of both properties, and nuclear in our view, is that this nonlinearity and chaos is presented in complex systems through the different scales or levels that make them. This particular property is called a fractal (Mandelbrot, 1982).

It is useful to approach the study of organizational behavior as a multilevel phenomenon composed of different levels (individual, group, organizational) that relate to each other so that the upper levels are the results of the emergence of processes from the lower levels (Klein & Kozlowski, 2000). Now, making use of complexity science, we can also say that the basic properties of complex systems (nonlinearity, chaos, etc.) appear repeatedly through the different levels that make these complex systems. It can also be argued that complex systems also exhibit the property of being fractals in the sense that "the degree of irregularity and/or fragmentation is identical at all levels" (Mandelbrot, 1982, p. 15).

A fractal (a term derived from the Latin *fractum*, fractured, and coined by Mandelbrot himself) "is a geometric shape that can be split into smaller parts, each of which evokes a smaller scale all" (Mandelbrot & Hudson, 2006, p. 17). A tree with its structure based on smaller branches and twigs, a river and its tributaries and streams, the human blood system or the evolution of a stock market in months, weeks or days, are all examples of fractal objects. All of them emphasized the close relationship between the macro and micro levels, between the whole and its parts. In addition to this, fractals open the door to the relevant question for a multitude of sciences (including social and behavioral sciences) of how to generate these global forms so intricate and complex emerging from local interactions between individual components of the system.

In particular, to understand work motivation as a fractal process, one would pay attention to how its evolution, its dynamic, repeats at different scales. For example, on time scales (analyzing the motivational dynamics at different scales of time as may be months, weeks and days), or situational scales (analyzing the dynamic of work motivation in the major tasks that make up that work, and sub-tasks that make these).

These investigations (if is possible to achieve) would be a new test about whether work motivation is (or is not) a phenomenon with irregular and unstable behavior over time. Furthermore, this

key aspect would clarify whether the high instability in work motivation that previous investigations are found should not be attributed to the changing nature of motivation, but instead consider that a working day spent on very different tasks in which, without a doubt, the motivation is different. In other words, the instability would not be attributed to the motivation at work but to different tasks and sub-tasks performed in this work.

Hypotheses

Before presenting the hypotheses that guide this research, we propose an assumption we believe to be reasonably argued that will support these hypotheses. We start by considering that the work performed by any worker is done by performing a series of tasks. Therefore, to evaluate work motivation of a person means to assess motivation that a person feels about performing different tasks that comprise their work. This has been the starting point of classical authors in the area. For example, Vroom (1964) saw motivation as the sum of the valences and the specific expectancies that are combined in an election determining worker behavior (i.e. his or her level of effort put at work). Meanwhile, Locke & Latham (1990) have raised the motivation as the set of energetic forces that drive our behavior towards the achievement of specific performance goals. And Bandura (1997) has argued that self-efficacy (a construct clearly related to motivation that today is considered as a fundamental theoretical approach in the area) should be considered as beliefs about the ability to cope effectively with certain tasks or specific activities. Therefore, to question the motivation at work is to question the motivations to different tasks that make up the work. As we will see in Instrument and Procedure sections this aspect has been considered in the way we have measured motivation.

Having considered these aspects, the hypotheses that guide our research are as follows:

H1: If we studied work motivation over time, it would present a high irregularity and instability.

H2: The level of irregularity (the degree of instability) in work motivation would be maintained across different scales (work-tasks-subtasks).

Hypothesis 1 is based on previous research that found evidence of nonlinear and chaotic behavior in the dynamics of motivation (Ceja & Navarro, 2011; Guastello et al., 1999, Navarro et al., 2007, Navarro & Arrieta, 2010). We believe that if we explore work motivation over time, we would find results that also highlight motivation as an irregular and unstable process. These properties of motivation have hardly been considered in the classic investigation. If we find results that confirm this hypothesis, it will be necessary to discuss the reasons for this omission in research agenda, and the implications of these results which are derived on theoretical and applied fields.

Hypothesis 2 is centered further into the work motivation as a complex process. Otherwise, when we analyze the behavior of motivation considering the overall work, the tasks that comprise it, or sub-tasks that make these tasks, the level of irregularity will remain similar. If this is the case, we can deduce that motivational dynamic has fractal properties. This would constitute a further and important step of the research conducted thus far, as they have not addressed whether the tasks can significantly affect the appearance of high irregularities found.

In this study, we do not address whether motivation at work also shows fractal properties in time scales. This because we believe that, today, it is difficult to obtain reliable and valid measures of work motivation in longitudinal designs with long periods of time (months, years). Perhaps in the future with the possibility of obtaining automated registrations, this type of research will be encountered more often..

METHOD

Participants

Participants received a letter presenting the objectives of the research and were invited to participate voluntarily in the study. We also guaranteed that all data collected would be treated according to the rules of anonymity and confidentiality.

The sample consisted of a portion of which was studied by Arrieta, Navarro and Vicente (2008). Sixty-nine participants were considered in this investigation, which showed a variety of tasks performed in their jobs, with a minimum of at least three different tasks. Thirty-five participants were female (51%), with a mean age of 34 years (minimum 20, maximum 57). The sample had 26% of basic schooling and 64% of technical or university education. All participants worked at the time of data collection, had organizational tenure with an average of 8.3 years (minimum 0.2 and maximum 28), and occupying the same position or function for an average of 4.9 years (minimum 0.2, maximum 20 years). They spent on average 8.9 hours of work per day (minimum 6 hours, maximum 12 hours), with an average working of 47.2 hours per week (minimum 30, maximum 72).

Taking into account the longitudinal research design, the sample choice was intended to collect workplace diversity by gender, age and profession. For example, within the sample there was a postman, a manager of a sport team, a human resources director, a bank employee, a household employee, a doorman, an accountant, a farmer, a family doctor, etc. Participants were recruited by researchers through third parties. Those selected were active workers who voluntarily agreed to be part of this study.

Procedure

The data collection design used was longitudinal. The diary technique was used based on time and signal contingent (Bolger, Davis, & Rafaeli, 2003). The application of these techniques allows us, according to Bolger et al. (2003), to record behavior over a time long enough to ensure you get a proper account of it. On the other hand, it captures the behavior and experience in the spontaneous and natural context in which it occurs. In applying the diary technique, we used electronic devices (PDA's) that participants carried with them throughout the study.

Participants had to answer the diary six times a day for a period of at least 21 days to get long time series required for subsequent analysis. The PDAs were programmed to collect data six times a day

at random intervals in order to achieve a distribution of records in which the majority of tasks and subtasks played by the participant in their work are represented.

There were initial training sessions for the participants in the use of the electronic device, and in the understanding of the instrument used. For example, we clarified the concepts of task (activity, with a start and an end, that intends to help achieve an objective for the organization) and goals (personal goals to be achieved by the participant related to the world of work or not; see Instruments section). Also, we conducted a pilot test with three participants in order to anticipate possible difficulties in the development of research (e.g., loss of data due to battery discharge, need to adjust the alarm volume of noticing participant's work context, etc.).

Instruments and Measures

The diary used consisted of a short questionnaire with four questions relating to the variables of interest. We used a brief instrument in order to avoid unwanted effects of fatigue that could be reflected in a high attrition throughout the study. The questionnaire used was similar to that employed by Navarro et al. (2007). Specifically, the following questions were asked:

1. What task am I carrying out at this moment?
2. How much does this task motivate me?
3. To what extent do I consider myself capable of performing this task well?
4. If I perform well this task, will I achieve my personal goals?

The first question collected contextual information in which the participant must provide a description of the particular task that he or she was doing at that time. Questions 3 and 4 collected two fundamental processes to understanding work motivation such as self-efficacy beliefs (Bandura, 1997) and perceptions of instrumentality (Vroom, 1964). Regarding the second question, it directly asked about the motivation of the person performing the task. Questions 2, 3 and 4 were presented with a measuring scale in the form of continuous bar (slider) and had the following anchors at the extremes: A

little-A lot (question 2), Not very capable-Very capable (question 3) and Unlikely-Likely (question 4). The participant marked on the bar, and that mark was automatically converted into a score between 0 and 100 depending on the distance to each anchor.

Analysis

Records obtained for participants were studied in order to refine the data by eliminating potential double records (when the participant answered twice immediately when there should have been a minimum duration of 15 minutes between the two records; this normally occurred when the participant was not sure whether the record would have been recorded in PDA). Two percent of the records had to be removed for this reason; it is a quantity not significant.

After that, the contextual information obtained from the first question of the diary was analyzed by three experts in work psychology to establish a system of categories for each participant, and all the observations were coded. The process was as follows: the first expert studied each participant individually, and established a system of categories (tasks and subtasks) inductively (i.e. based on the information provided by each participant, after which the expert coded all records in the categories that had been established). Next, two new experts reviewed the proposed category system in terms of their relevance to group the information recorded by the participant. They also revised the coding performed and its relevance. Following this work, these new experts could propose changes of both the system of categories created and the coding performed by the first expert. Then a new round of work with the data was made. This process allowed us to calculate an index of agreement among judges, who then noted 74.39% agreement for tasks in the first revision, and 97.47% in the second; for subtasks, 71.16% agreement in the first revision and 98.64% agreement in the second. These results demonstrated the level of agreement among judges was high in the first revision and increased considerably after the second review.

With regard to questions 2, 3 and 4 of the diary, and because the information collected was quantitative, we created a single average index of motivation. This simplified the analysis of time series for each participant. Previously we studied the correlations between these three pieces of information to justify the creation of the index average. Following these initial analysis, we performed subsequent line graphs of the total time series obtained, the main tasks and major subtasks.

The MSSD, mean square of successive differences, for the work series was calculated by the total series of work, the series of tasks and the series of subtasks. The MSSD calculates the degree of variability or instability in the time series and has been used previously in similar studies interested in showing instabilities in work motivation (Arrieta et al., 2008) or affect (Woyshville, Lackamp, Eisengart & Gilliland, 1999). It follows the next formula (Von Neumann, Kent, Bellinson & Hart, 1941):

$$MSSD = \frac{\sum_{i=1}^{n-1} (x_{i+1} - x_i)^2}{n - 1}$$

where X_i the value of the variable at time *i,* X_{i+1} the value of the variable in the next time, and *n* the total number of records in the series.

Finally, statistical comparison was made to relate the instability between the three levels: (a) series of total work, (b) series of categories or tasks, and (c) series of subcategories or subtasks using hierarchical regression analysis.

RESULTS

We obtained a total of 7036 records from the 69 participants. In Table 1 we present the descriptive statistics of the time series of the four variables included in the diary. Table 1 also includes the within- and between-persons correlations. Considering now the mean values, we would like to point out that self-efficacy as the variable in which the values are higher (M = 85.97) as well as showing a minor deviation (SD = 18.43). In the opposite situation it would be the motivation (question 2 of the

diary that directly inquired by how motivating the task was) with the lowest mean value (M = 58.94) and the highest deviation (SD = 32.04).

Regarding the within- and between-persons correlations all values are statistically significant. These positive correlations found between motivation, self-efficacy and instrumentality, both at within and between levels, justify the creation of the index average. The correlation between these variables and the index created is also positive and statistically significant.

Insert Table 1 here

The graphical analysis, line charts using the average index, reported high fluctuations at all levels: work, major tasks and subtasks. In Fig. 1 we selected two cases, participants 2 and 16, as examples. These two cases showed similar levels of fluctuation (M_{MSSD2} = 368.82, M_{MSSD16} = 388.32) to the average of all 69 participants (M_{MSSD} = 382.19). As we can see the degree of irregularity in this series is high and, although it appears to decrease as we go from work to tasks and from tasks to subtasks, still a number of serious irregularities appear to deepen the tasks and subtasks that comprise the overall work. These results would confirm our first hypothesis.

Insert Figure 1 here

We would be pending a systematic studyof this phenomenon which we began to appreciate in these graphics, that is we should deepen if this level of irregularity in work motivation is maintained, is similar across the tasks and subtasks levels. The results from hierarchical regression analysis used to investigate this issue are presented in Tables 2 and 3. These results are clear in this respect: no tasks or subtasks are predictors of the variability in work motivation. Instead, the only significant predictor is the

participants. Otherwise, individual differences are important and influence the level of fluctuations shown (explained 8% of the fluctuations in both analysis), but the fact of performing different tasks and subtasks within each job do not introduce any significant variability. These results would confirm our second hypothesis.

Insert Table 2 here

Insert Table 3 here

DISCUSSION

Work motivation is a key process for understanding the relationship between workers and their organizations. The level of effort and persistence in this effort are keys to understand employee performance, an element of great interest to managers. The most classical motivational theory has emphasized the consideration of different cognitive processes determining work motivation, such as expectancies, goals, self-efficacy beliefs or justice perceptions (Kanfer, Chen & Pritchard, 2008b). An important part of these theories have been criticized for the consideration of motivation as episodes rather than real processes (Navarro, Arrieta & Ballén, 2007), which has led to the current research agenda to emphasize the need to explore how motivation changes and evolves over time (Kanfer et al., 2008a).

Recent research has concerned precisely to describe the dynamics of work motivation in short time scales (days and weeks). These investigations have shown that work motivation changes in a non-linear and chaotic way over time (Ceja & Navarro, 2011; Guastello et al., 1999; Navarro et al., 2007; Navarro & Arrieta, 2010). However, a question that has yet to be addressed in this body of generated knowledge is whether the nonlinear dynamics and chaos that were found could be due to the diversity of

tasks that make up the work and not so much that motivation, in itself, would follow nonlinear and chaotic dynamics. That is, if the fluctuations found in previous studies can or cannot be explained by the fact that in each work environment, workers perform several tasks to which the workers also shows different levels of motivation. If this is evident, the study of work motivation dynamics could find levels of fluctuations that actually hide different levels of motivation attributable to the tasks and subtasks which are included in the work; however, we could not refer to that work motivation as fluctuating. This is the research question we addressed in this study and the results have been clear: the variety of tasks and subtasks that make up any work does not introduce significant variability in the motivational dynamics.

Main Contributions of the Present Study

In our opinion, the results of this study showed essentially two things. First, work motivation has high fluctuations when it is studied over time. Second, these fluctuations are maintained across different scales (in our case, work-tasks-subtasks) which would indicate that work motivation has a fractal structure.

Regarding the first of the findings, our study supports previous research that has found that work motivation shows a significant amount of fluctuations over time (Ceja & Navarro, 2011; Guastello et al., 1999; Navarro et al., 2007; Navarro & Arrieta, 2010). This fluctuating nature of work motivation, as we anticipated in the introduction of this paper, has hardly been considered in the classic research agenda. Instead, the predominant research in the area has considered that work motivation is, more or less, a stable process, and therefore, can be investigated to meet the classical criteria of reliability and validity, using between-persons and cross-sectional designs. If we were in front of a stable and relatively fixed construct to collect single data in only one temporal frame would be a good way to describe it, and also to make comparisons between people. Clearly this assumption rests on the conveniences we have had in the research and the tools we used, mostly questionnaires. But times have changed. Today, in

addition to questionnaires, we have other tools (such as diaries that we have used here) that the worker can carry implemented on an electronic device (PDA's in our case). This also allow us to collect data in several points of time (thanks to the use of experience sampling method), all of which permit us to use longitudinal approaches rather than cross-sectional, jointly with the use of a very sensitive approach to catch the immediate context in which the worker is. With this, two "C"s advocated by Kanfer et al., (2008a) for future research, context and change, are included in this design and the learning we draw from this is that work motivation is very dynamic. Cross-sectional studies have no interest in accordance with this finding. Perhaps because of this, recent literature begins to stress the need to address organizational behavior using designs capable to explore change and its dynamics at within-person level (Ilies & Sonnentag, 2011; Xanthopoulou, Bakker & Illies, 2012).

As a second major result, this study highlights the finding that the level of fluctuations is maintained across different scales, in our case work-tasks-subtasks. In our view, it is important for at least two reasons. First, we provide further evidence that work motivation is a complex dynamic process (nonlinear and chaotic according to the studies mentioned repeatedly throughout this article) and this complex dynamic could not be attributed to doing different tasks during a working day. The tasks and subtasks do not introduce additional significant variability. Work motivation is a complex dynamic process regardless of the tasks that comprise a work. In our opinion this is a contribution in support of research previously done (Ceja & Navarro, 2011; Guastello et al., 1999; Navarro et al., 2007; Navarro & Arrieta, 2010). Second, the results reveal similar levels of fluctuations, similar irregularities at different scales. Therefore, we would be facing a fractal. Work motivation would have fractal properties; in our case, repetition of patterns at different scales. Again, this finding serves to support the research that had previously found nonlinear and chaotic behavior. Now, we provide evidence that work motivation also shows another basic property of complex dynamic systems: *fractality*. Concluding with the above, we can say that work motivation is a complex dynamic process.

Practical Implications

If motivation is a complex dynamic process, management should pay attention to its basic properties as such (nonlinearity, chaos, *fractality*). We think that the fact that work motivation shows these properties can be interpreted in terms of what has been called the healthy variability thesis (Ceja & Navarro, 2011). According to this thesis, positive organizational behavior (here, high levels of motivation) show chaotic dynamics because this type of dynamic (and not others, for example linear or random) allow adaptation and flexibility of behaviors that end up being beneficial and healthy. The thesis of healthy variability is based on previous studies in the field of physiology which have repeatedly found chaotic behavior of many body functions (heart rate, brain function, etc.) when the body is healthy, and occurs a reduction of this complex dynamic when that body becomes sick. Goldberger's work (e.g. 1991) is a good illustration in this regard to understand that the body functioning chaotically wins ability to adapt to an environment that is never fixed and continually demands new requirements. In the area of organizational psychology the healthy variability thesis has been used to explain how workers with chaotic dynamics are those that show high level of motivation (Arrieta et al., 2008), increased frequency of flow experiences (Ceja & Navarro, 2011), or how basketball teams with chaotic dynamics in their performance are those just reaching better positions at the end of the season (Ramos-Villagrasa, Navarro & García-Izquierdo, 2012).

All this should lead to professional managers and human resources workers in organizations to consider the instability and fluctuations in work motivation as something natural. This message is important to emphasize because usually when we playing management roles, we emphasize the need to control and to pursue stability. If work motivation is not stable, it is pointless to pursue it so. Given the ongoing environmental uncertainty, the adaptive behavior is to have motivational dynamics unstable. And the manager would do well to be wary when encountering linear or stable dynamics.

But it should not be confused with unstable dynamics and random dynamics in motivation. The motivation needs some structure. Ceja and Navarro (2011), for example, found that workers who showed a higher occurrence of flow experiences were those with chaotic dynamics in the flow (as we have said), and had a very clear and fixed weekly schedule (i.e. worked from Monday to Friday, with the same enter and exit times each day). The edges and borders are necessary to contain the motivation and not fall into anxiety (just that study showed that workers in random dynamic of flow experiences reported higher anxiety and were workers who had more flexible schedules). In a very different field Hock (1999) has detailed the creation and development of a successful organization, such as Visa International, which can be regarded as an excellent example of a mixture of planning and improvisation. Again it appears that the key seems to be a mixture of controlled instability, or "bounded instability" as Stacey (1992) called it.

To consider motivation as a system with bounded instability, managers should be led to think in terms of clarifying the boundaries (e.g., designing jobs with minimum specifications, using management by values, setting goals genuinely challenging that provide psychological meaning for the worker, etc.) along with providing broad autonomy to the worker in the course of their work. More so than managers, real leaders will be needed who can influence perceptions about the meaning of work and the values underlying it.

Limitations and Future Research

The research developed here has the merit of working with a very large amount of records (7036) that have been categorized by three different judges with a high level of agreement. The work done by the judges for this has been hard and long. However, the research has also some limitations. For example, the sample of participants is limited (69) and it would be advisable to work with larger samples. It is true that we have tried to collect data from a small sample with the maximum of diversity as possible in terms of types of jobs. However, larger samples will be needed for future research.

Perhaps the main limitation of the sample is that we have used the criteria for final inclusion in the study to have at least three different tasks. It is true that an important part of our works consist in performing a variety of important tasks. However, it is also true that there are jobs that are terribly monotonous in which the employee spends the whole time basically doing a single task. In the sample we had no such participants to test whether in these cases there also are high fluctuations. For future research it would be necessary to extend the sample and pay attention to different occupations or professions.

Finally, it should be noted that the categories have been established from the textual descriptions that made the participants. At this point, we know that not all workers are equally able to describe well what they are doing and to detail with sufficient clarity the different tasks performed in their jobs. For future research it would be necessary to complement this study with others in which that category systems are proposed deductively using some tasks classifications proposed by experts.

Moreover, it is also necessary to research into possible variables that are influencing the emergence of the complex dynamics found here. We would like to suggest three variables that future research should address: first, the influence of personality traits. The results found here support the idea that there are individual differences of interest in the motivational dynamics. Further explore which of these individual differences in particular may be influencing the occurrence of such fluctuations would contribute to further development in the area. It would have immediate consequences in terms of management (for example, to search for certain personality profiles in the selection processes).

Second, we believe it would be very interesting to study how emotions at work may influence the motivational dynamics. It is known that discrete emotions can be highly unstable (Gray & Watson, 2001), and it is likely that the experience of emotional instability has a significant impact later in the motivational dynamics. Longitudinal studies on the relationship between emotions and motivation are

needed again. Another way to explore this could be to study the relation between the management of emotions and work motivation in specific contexts (e.g. emotional labor).

Finally, and it may not be a minor issue, future research should explore the possible existence of temporal patterns in the motivational dynamics and its possible relationship to the presence of certain circadian rhythms (morning-afternoon, Monday-Friday, etc.). It is known, for example, that there is an existence of certain rhythms in mood (e.g. more positive moods on Fridays and Saturdays, in the afternoons, etc.; see Watson, 2000), therefore, we could also think of the influence of these rhythms in the motivational dynamics.

Conclusions

Work motivation is a dynamic process that presents fluctuations throughout the day and week. Previous studies have realized this dynamic nature of work motivation, and in the present study we have also found evidence supporting this fact. But there remained to be considered whether such fluctuations in motivation were caused by to perform different task performances at work. The results of this study are clear in this regard: Tasks do not matter. These fluctuations found in work motivation are also repeated in the motivation towards tasks and subtasks. The fluctuations are repeated, therefore, at different levels. The work motivation would have a fractal structure.

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TABLES

Table 1: Descriptive Statistics and Correlations Among Variables.

Variable	Number of registers	X	Sd	Motivation	Self-efficacy	Instrumentality	Average index created
Motivation	7036	58.94	32.04	-	0.14**	0.34**	0.32**
Self-efficacy	7036	85.97	18.43	0.15**	-	0.40**	0.69**
Instrumentality	7036	65.38	28.54	0.29**	0.29**	-	0.89**
Average index created	7036	72.83	20.52	0.41**	0.60**	0.85**	-

Note: Coefficients below the main diagonal reflect within-person correlation based on 7036 registers across 69 participants. Coefficients above the main diagonal reflect between-persons correlations based on 69 participants. ** $p < .01$.

Table 2: Hierarchical Regression Analysis of Participants and Tasks on MSSD.

Model	Unstandarized coefficients	Standard error	*t*	Standarized coefficients
1. Constant	73.07	1.15	63.13	
Tasks	-0.03	0.48	-0.08	-0.00*(ns)*
2. Constant	63.93	1.57	40.49	
Tasks	0.42	0.47	0.90	0.03*(ns)*
Participants	0.21	0.02	8.13	0.29**

Note: R^2 of model 1 equal to -0.01. R^2 of model 2 equal to 0.08. **p < 0.01.

Table 3: Hierarchical Regression Analysis of Participants and Subtasks on MSSD.

Model	Unstandarized coefficients	Standard error	*t*	Standarized coefficients
1. Constant	68.67	1.14	60.14	
Subtasks	0.67	0.15	4.36	0.16*(ns)*
2. Constant	62.40	1.43	43.60	
Subtasks	0.42	0.15	2.75	0.10*(ns)*
Participants	0.20	0.03	6.91	0.25**

Note: R^2 of model 1 equal to 0.02. R^2 of model 2 equal to 0.08. **p < 0.01.

FIGURES

Figure 1: Line chart of work motivation fluctuations across different scales: work, tasks and subtasks. Participants 2 and 16.

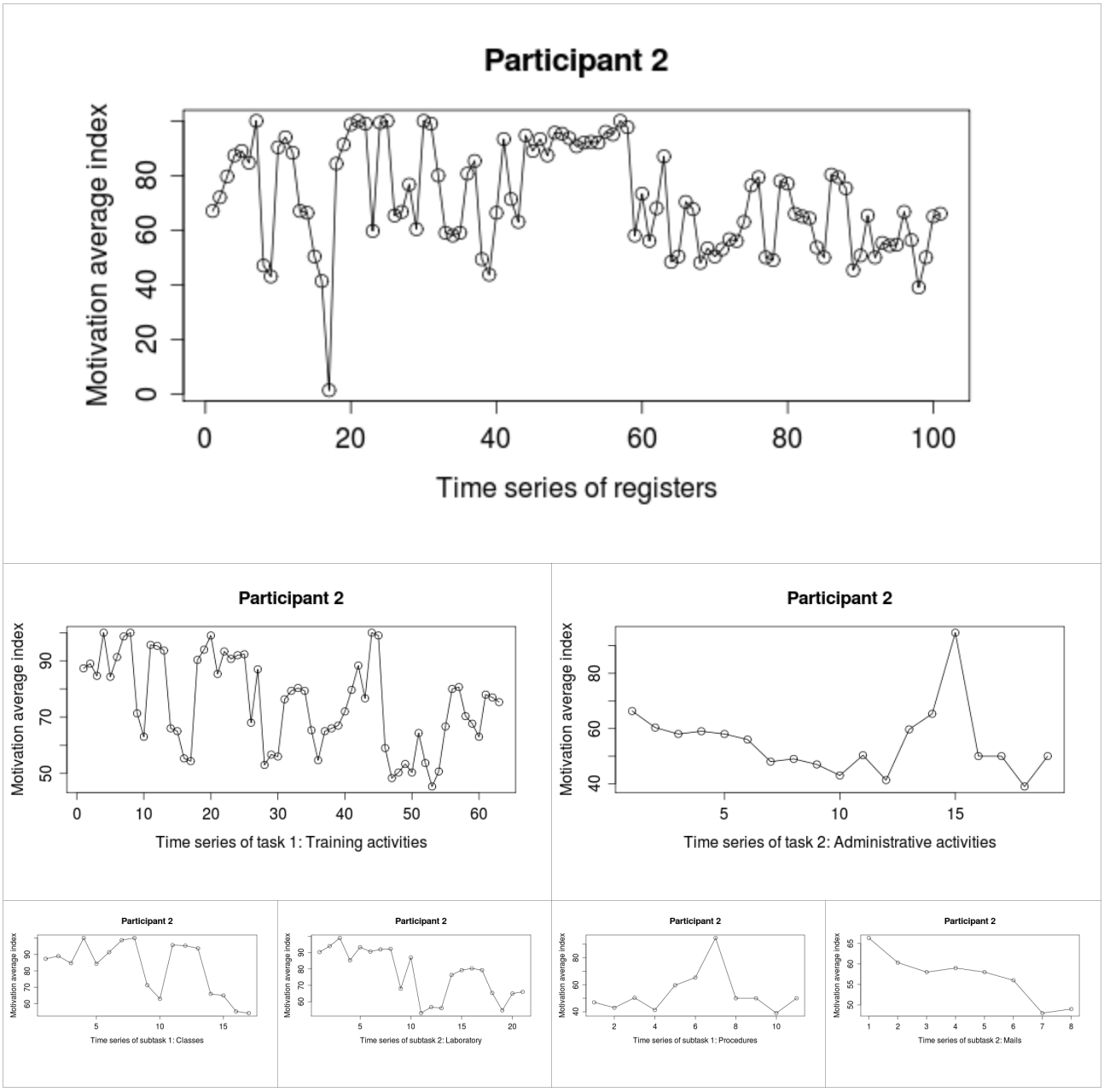

Figure 1 (cont.).