

Work engagement: a study of daily changes
Engagement en el trabajo: un estudio de los cambios diarios
Engajamento no trabalho: um estudo das mudanças diárias

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Abstract: This research aimed to verify the daily intraindividual and interindividual variations of work engagement and to investigate the predictors of this phenomenon and of the role performance at work, as well as the mediating role of engagement in the relationship between these predictors and performance. The sample consisted of 116 workers of both sexes (71.9% female). Through multilevel modelling, it could be identified that role ambiguity constituted a significant and negative predictor of engagement and performance, while participation in decision-making was characterized as a positive predictive variable of both constructs. The task complexity, in turn, proved to be a negative predictor of performance. Contrary to expectations, engagement did not show intra-individual variations. Brazilian organizations can benefit from these findings and seek to intervene in the work context.

Key words: role ambiguity, task complexity, decision-making, work engagement, role performance

Resumen: La presente investigación buscó verificar las fluctuaciones diarias intraindividuales del engagement laboral e investigar los predictores de este fenómeno y del desempeño de roles en el trabajo, así como el rol de mediación del engagement en la relación entre tales predictores y el desempeño. La muestra fue compuesta por 116 trabajadores, de ambos sexos (71,9% del sexo femenino). Por medio del modelado multinivel, fue posible identificar que la ambigüedad de papeles se constituyó en un predictor significativo y negativo del engagement y del desempeño, mientras que la participación en la toma de decisión se caracterizó como una variable predictora positiva de ambos constructos. La complejidad de la tarea, a su vez, reveló una predicción negativa del desempeño. Al contrario de lo que se esperaba, el engagement no presentó variaciones intra-individuales. Las organizaciones brasileñas pueden beneficiarse de estos hallazgos y buscar intervenir en el contexto de trabajo.

Palabras clave: ambigüedad de roles, complejidad de la tarea, toma de decisión, engagement laboral, desempeño de roles

Resumo: Esta pesquisa teve como objetivo verificar as variações diárias intraindividuais e interindividuais do engajamento no trabalho e investigar os preditores desse fenômeno e do desempenho no trabalho, bem como o papel mediador do engajamento na relação entre esses preditores e o desempenho. A amostra foi constituída por 116 trabalhadores de ambos os sexos (71,9% do sexo feminino). Por meio da modelagem multinível, identificou-se que a ambiguidade de papel constituiu-se em um preditor significativo e negativo do engajamento e do desempenho, enquanto a participação na tomada de decisão caracterizou-se como uma variável preditiva positiva de ambos os construtos. A complexidade da tarefa, por sua vez, foi um preditor negativo do desempenho. Ao contrário do que se esperava, o engajamento não mostrou variações intraindividuais. As organizações brasileiras podem se beneficiar dessas descobertas e procurar intervir no contexto do trabalho.

Palavras-chave: ambiguidade de papéis, complexidade da tarefa, tomada de decisão, engajamento no trabalho, desempenho de papéis

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Introduction

The emergence of positive occupational health has tried to discover the causes of health at work and the possible consequences associated with it. One of the phenomena that are frequently studied in this context is work engagement (Schaufeli, Salanova, González-Roma, & Bakker, 2002). Despite the advances in investigation in this area, research on this construct still needs a broader scope, especially within its intrapersonal variations (Schaufeli & De Witte, 2017).

Thus, for some time, engagement was studied more globally, or rather as a trait. More recently, however, the construct has also come to be defined as a state (Bakker, 2014; Sonnentag 2003; Xanthopoulou, Heuven, Demerouti, Bakker, & Schaufeli, 2008). In contrast to the propositions by Schaufeli et al. (2002), the state perspective argues that individuals' engagement may fluctuate over short periods of time (Sonnentag, Dormann, & Demerouti, 2010). Studies have focused on assessing changes that occurred over days or weeks and checking whether individuals feel more engaged some days than others (Christian, Garza, & Slaughter, 2011; Petrou, Demerouti, Peeters, Schaufeli, & Hetland, 2012; Sonnentag, 2003; Xanthopoulou et al., 2008).

For these reasons, Sonnentag et al. (2010) suggest the investigation of levels of engagement on specific days as a way of obtaining a better understanding of the relationships between engagement and its antecedents and consequences, based on a closer analysis of the workers' reality. These

studies have therefore been based on diary research designs (Schaufeli & De Witte, 2017), in which the subjects are monitored for one or more weeks, in order to verify the intraindividual changes occurring in the constructs investigated. These studies are still very recent (Xanthopoulou et al., 2008), which indicates the need for further investigations of this nature, which are capable of deepening the understanding of the antecedents and consequences of state engagement (Bakker, Demerouti, & Sanz-Vergel, 2014).

Thus, the objective of this study was to investigate intraindividual and interindividual variations in work engagement. This research also aimed to analyse the influence of job demands (task complexity and role ambiguity) and work resources (participation in decision making) on daily engagement, as well as the influence of the latter on an organizational result (performance of roles of work).

This research therefore offers important contributions to the literature and for practical applications. The study aims to identify engagement as a state arising from intraindividual variations. In addition to these relatively recent studies, they have not yet been sufficiently explored in relation to all demands, work resources and consequences of engagement, such as the complexity of task variables, role ambiguity, participation in decision-making and work role performance. By integrating these variables, this study contributes to the Theory of Demands and Resources of Work (JD-R), investigating variables on which little research had been done in combination with work engagement. Moreover, in Brazil, there is a lack of research

on this phenomenon, as well as of research designs in the form of diaries. Finally, Brazilian organizations can benefit from these findings and gain competitive advantage by intervening in the work context as a way to encourage individuals to become connected daily to their work activities.

Why a diary study?

Studies using a diary study research methods have become more popular in the organizational and the work field in the world. Recent work has investigated how the relations between job characteristics, psychological states, and outcomes develop within employees across time (Schaufeli & Taris, 2014). It is a method used to investigate ups and downs in individuals' experiences in different settings, which accompanies respondents for a period of one or two weeks, applying questionnaires throughout the week, one or more times a day. These studies examine both within-person and between-person processes and their interplay. Researchers want to know how affective experiences influence workers (Binnewies & Sonnentag, 2013). In this sense, measuring engagement over a week is a way to check the changes that can occur with the construct as well as with your antecedents and consequents.

Theory and hypotheses

Role ambiguity, engagement and role performance

Work engagement refers to a positive and fulfilling work-related mental state, characterized by vigour (high levels of energy while working), dedication (sense of meaning, enthusiasm, inspiration, pride and challenge) and absorption (complete concentration of the individual at work, which makes time pass quickly without his noticing) (Schaufeli et al., 2002). Work engagement is associated with a personal energy that individuals bring to their work (Bakker et al., 2014). More recently, engagement has been understood as a state-

shaped construct, that is, a transient experience that fluctuates within individuals over a short period of time (Sonnentag et al., 2010).

The JD-R theory has been the main reference model for studies on work engagement and is focused on the processes in which the work demands, the work resources and the personal resources influence the development of this construct (Bakker et al., 2014; Bakker & Demerouti, 2017; Schaufeli, 2017). In this sense, it has elicited several investigations aimed at identifying the main organizational and individual predictors of work engagement, as well as their consequences (Bakker et al., 2014).

Work demands consist of aspects of the job context that require effort from employees and, consequently, generate physical and psychological stress and costs (Bakker et al., 2014). They are currently classified under obstacle and challenging demands (Crawford, LePine, & Rich, 2010).

Obstacle demands relate to the stressful aspects of the work environment that tend to impede personal growth, learning and achievement of objectives. Some of the obstacle demands studied in relation to work engagement and that are negatively associated with the construct are, for example, organizational policies and role conflict (Crawford et al., 2010). Specifically, in diary studies, negative relations were observed between engagement and situational constraints (Sonnentag, 2003). Tadic Vujcic, Oerlemans and Bakker (2017), in a diary study involving teachers, found that on days when teachers experienced obstacles (e.g. annoyances), they experienced fewer positive effects and lower work engagement.

Some obstacle demands have not yet been sufficiently explored in relation to state engagement, as is the case, for example, of role ambiguity. Roles are considered to be a set of activities or behaviours that are expected by the employees and that assure a particular position in an organization (Katz & Kahn, 1978). The ambiguity of roles, therefore, concerns the lack of information needed for a particular organizational position. This phenomenon occurs when roles are not

sufficiently articulated in terms of domains, methods of achievement, and consequences of role performance (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964).

Research indicates that role ambiguity has a negative influence on job satisfaction, organizational commitment and work engagement, thus contributing negatively to employees' mental health (Fisher & Gitelson, 1983). In this sense, it was to be expected that the ambiguity of roles would have a negative relation with work engagement.

The performance of work roles, in turn, refers to the total set of performance responsibilities associated with the employees themselves (Griffin, Neal, & Parker, 2007). When individuals experience high levels of role ambiguity, there are harmful effects on employees' attitudes and behaviours (Tubre & Collins, 2000). The ambiguity of roles can increase stress, because individuals are concerned with the performance of their job functions and the achievement of valued results, which often causes frustration and anxiety. These feelings may contribute to less effective work (Kahn et al., 1964), leading to the reduction of satisfactory performance at work (Tubre & Collins, 2000). Therefore, it is likely that role ambiguity also has a negative relation with the performance of work roles. Based on these considerations, the following hypotheses were formulated:

Role ambiguity is negatively associated with work engagement at the intraindividual (H1a) and interindividual (H1b) levels.

Role ambiguity is negatively associated with role performance at the intraindividual (H2a) and interindividual levels (H2b).

Task complexity, engagement and role performance

Challenging demands consist of aspects of the work context that, although stressful, contribute to the personal growth of the individual and for him to gain future earnings. Some of the challenging demands that have been studied regarding work engagement and which are positively associated with the construct are high levels of job responsibility,

work overload and time pressure (Crawford et al., 2010).

Diary studies have also found positive relationships between work engagement and time pressure (Petrou et al., 2012), as well as physical, cognitive and emotional demands (Garrick, Mak, Cathcart, Winwood, Bakker & Lushington, 2014). Tadic Vujcic et al. (2017) found that, on days when teachers experienced more challenges (such as workload, urgency in time, responsibility and work complexity), they underwent more positive effects and experienced more work engagement.

The literature review reveals that some challenging demands have not yet been sufficiently explored as possible predictors of state engagement, which is the case of task complexity. This demand is defined as the individual's perception of how complex the task is being difficult to execute (Chae, Seo, & Lee, 2013). Edwards, Scully, and Brtek (2000) argue that work activity involving complex tasks requires the use of high-level, more mentally challenging skills, which probably leads to positive motivational results.

In this sense, task complexity has presented positive relations with the employee's creative ideas (Chae et al., 2013) and performance (Chernikova et al. 2016). It should be stressed that, unlike obstacle demands, challenging demands can be motivating and contribute to good performance (Tadic Vujcic et al., 2017). In this sense, a positive relation was expected between task complexity and work engagement and role performance, which led to the elaboration of the following hypotheses:

Task complexity is positively associated with work engagement at the intraindividual (H3a) and interindividual levels (H3b).

Task complexity is positively associated with role performance at the intraindividual (H4a) and interindividual levels (H4b).

Participation in decision-making, engagement and role performance

Besides the demands, work resources also act as predictors of engagement. These resources constitute aspects of the job context

that are functional for the attainment of work goals, which is why they stimulate personal growth, learning and development, as well as reduce the work demands and associated costs (Bakker et al., 2014).

In this sense, autonomy, variety of skills, performance feedback and opportunities for growth and participation in decision-making (Bakker & Demerouti, 2017) are positive predictors of engagement. Specifically as a state, autonomy, supervisor feedback and opportunity for development proved to be positive weekly predictors of work engagement, which were also positively related to job performance (Bakker & Bal, 2010). In addition, social support influenced engagement in diary studies positively (Christian et al., 2011). Few studies, however, have investigated the role participation in decision-making plays in work engagement and role-performance as a state.

Participation in decision-making is about the worker's influence in decision-making processes at high levels, such as deliberations on job design and discussion of problems with senior managers. Individuals who are concerned with the ability to maximize control over their decisions are more likely to affect them. This is because the perception of their level of direct participation in the decision-making process and also their ability to exercise some degree of control is related to their ability to present evidence to decision makers before they are made. In this sense, a work environment that supports participation and the contribution of ideas is important for the workers to feel that they have the opportunity to participate in decision-making (Tyler & Blader, 2000).

Thus, when managers include employees in decision-making processes, they can promote the perception of equity among individuals in the organization and thus facilitate favorable organizational outcomes (Tyler & Blader, 2000). To give an example, positive correlations have been verified between participation in decision-making and satisfaction at work (Afrasiabi, Solokloo, & Ghodrati, 2013). In that sense, a positive relation is also probable between participation

in decision-making and work engagement and role performance. Hence, the following hypotheses were formulated:

Participation in decision-making is positively associated with work engagement at the intraindividual (H5a) and interindividual (H5b) levels.

Participation in decision-making is positively associated with role performance at the intraindividual (H6a) and interindividual (H6b) levels.

Work engagement and role performance

The positive outcomes of work engagement often refer to motivational outcomes such as creativity (Bakker & Xanthopoulou, 2013), as well as organizational outcomes, such as organizational citizenship behaviours (Bakker et al., 2014; Christian et al., 2011; Rich, LePine, & Crawford, 2010). In diary studies, positive relationships can be found between work engagement and proactive behaviours, such as daily personal initiative and the search for learning (Sonnetag, 2003).

The significant relationship between work engagement and work performance has often been confirmed in studies on the constructs (Alessandri, Borgogni, Schaufeli, Caprara, & Consiglio, 2015; Bakker & Bal, 2010; Christian et al., 2011). This relationship has not been sufficiently explored as a state though. In diary studies, role performance has been a positive consequence of job redesign (Demerouti, Bakker, & Halbesleben, 2015) and job recovery (Volman, Bakker, & Xanthopoulou, 2013) behaviours. Therefore, role performance could also act as a positive consequence of job engagement. In this sense, the following hypothesis was formulated:

Work engagement is positively associated with role performance at the intraindividual (H7a) and interindividual levels (H7b).

The mediating role of work engagement

Considering the direct influences of role ambiguity, task complexity and participation in decision-making on engagement and

performance, besides the direct effect of engagement on performance, it can be assumed that engagement can act as a mediating variable of the relations among demands, work resources and consequences of engagement. In addition, research evidence has shown that fluctuations in work engagement may occur as a function of the daily changes that occur at work, often related to demands. When individuals have access to many resources though, they are better able to cope with the demands of work, so that resources can act as motivators in search of positive outcomes at work (Bakker, 2014).

Research reports that work engagement mediated the relations of value congruence, perceived organizational support and self-referenced evaluations with task performance and organizational citizenship behaviour (Rich et al., 2010). In a longitudinal study, engagement mediated work resources (interpersonal and supervisor relationships, task resources), personal resources (self-esteem) and work ability (Airila, Hakanen, Schaufeli, Luukkonen, Punakallio, & Lusa, 2016). Specifically in diary studies, engagement mediated the relationship between self-efficacy and intra- and extra-role performance (Xanthopoulou et al., 2008), also mediating the relationship between recovery

levels with personal initiative and the search for learning (Sonnenstag, 2003).

In short, engagement has mediated the relationships between work and personal resources with motivational and organizational results. No research has been found in the literature, however, that integrates work demands and resources in daily engagement (Bakker, 2014). In this sense, we aimed to investigate the mediating role of engagement in the relationship between an obstacle demand (role ambiguity), a challenging demand (task complexity) and a job resource (participation in decision-making) and role performance. Therefore, the following hypothesis was formulated:

Hypothesis 8a: Work engagement mediates the relationship of role ambiguity, task complexity, and participation in decision-making with role performance at the intraindividual level.

Hypothesis 8b: Work engagement mediates the relationship of role ambiguity, task complexity, and participation in decision-making with the performance of roles at the interindividual level.

In figure 1, the theoretical model is presented. The research hypotheses are also indicated.

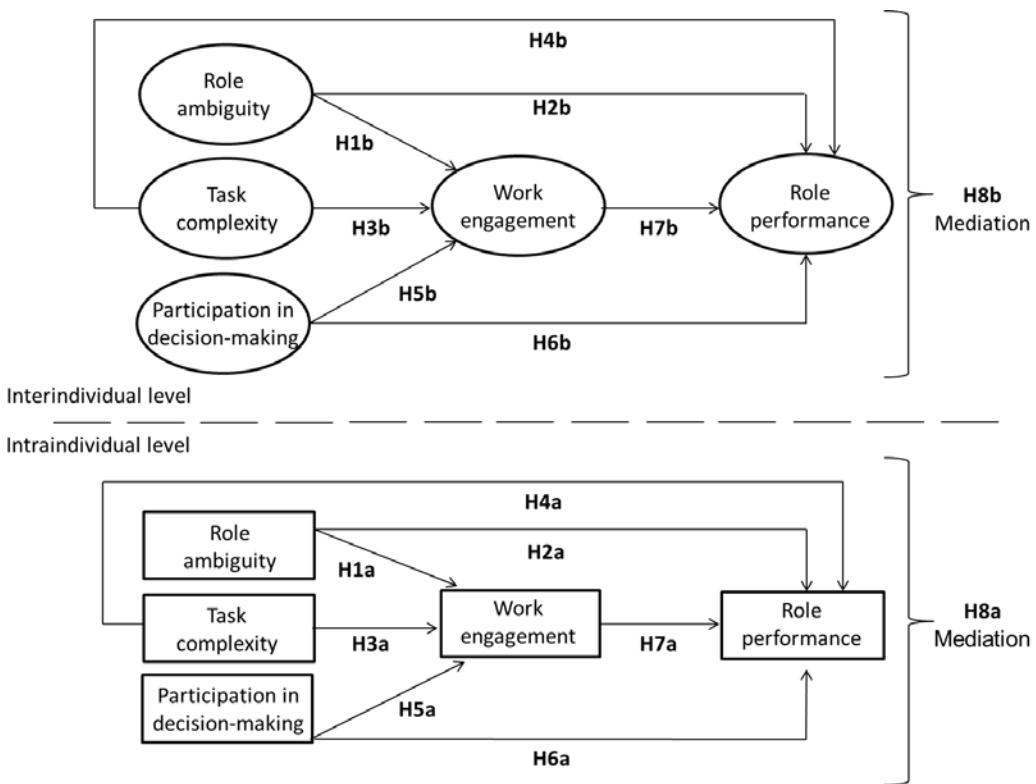


Figure 1
Research model

Materials and methods

Participants and Procedures

Approximately 200 workers were invited to participate in the research voluntarily. The inclusion criterion was at least one year of work experience at the time the instruments were applied, as the purpose of this study was to investigate daily fluctuations in workers' feelings and behaviors. From a convenience sample, 116 Brazilian workers answered a general questionnaire with self-reported questions and demographic data, as well as instruments applied daily during five consecutive days of work. Participants who agreed to participate in the study signed the Informed Consent Term.

The application of the questionnaire occurred in two ways: online and paper and pencil application. In the online application, initially, a brief explanation was given about the objectives of the research, followed by a link that led directly to the initial screen of the research. Ninety-nine participants answered the questionnaire electronically through the

link sent daily. The paper and pencil application was based on an individual and person-to-person approach of the participants, with the workers initially reading the instructions, filling out the questionnaires daily and then returning them to the researchers. Seventeen participants answered the questionnaire on paper and pencil. In all situations, the respondents were informed about the anonymity of their answers.

The general questionnaire (intended to investigate engagement as a trait), together with the questions on the sample characteristics, were applied on the Friday preceding the week surveyed, while the daily instruments were forwarded each day of the week, starting on Monday and ending on Friday. Participants received reminders to complete the questionnaire, answering at the end of the workday. Of this total, sixteen workers stopped answering the protocol only once (one participant did not answer the general questionnaire, one participant did not answer on the first day of the survey, one did not answer on the third day, six on the fourth day and seven on the last day). We chose to

maintain these participants in the database because the multilevel models for studies with repeated measures, used in this study, can cope with missing values at different moments (Hox, Moerbeek, & Shoot, 2017). In addition, the omissions represented less than 3% of the planning of measures (116 subjects X 5 times = 580 measures, 16 omissions / 580 = .027)

Participants were male and female, being 71.9% female. The participants' ages ranged from 19 to 69 years, with an average of 36.7 years ($SD = 11.42$). Eighty-three per cent of the respondents lived in the state of Minas Gerais and 13.8% lived in the state of Rio de Janeiro. With regard to education, almost half of the sample reported holding a postgraduate degree (45.2%). Participants belonged to different work organizations and different occupations, with 19% working as a teacher, followed by 7.8% of public servants, 6.9% of administrative assistants and 6.9% of psychologists.

Instruments

The general questionnaire was aimed at identifying demographic information, including questions regarding gender, work experience and education. General scales were also applied to investigate trait characteristics, which are described below.

The Subjective Task Complexity Scale developed by Mangos and Steele-Johnson (2001) was used to measure the complexity of the task. It is composed of four items, answered on seven-point Likert scales, ranging from one ('I totally disagree') to seven ('I strongly agree'). An example of an item is "The tasks I usually do in my job are hard to understand".

Role ambiguity was measured by means of Rizzo's Role Ambiguity Scale, House and Lirtzman (1970). The instrument is composed of six items, answered on five-point Likert frequency scales, ranging from one ('does not apply at all') to five ('fully applies'). An example of an item is "In my work I'm not sure what degree of authority I have."

Participation in decision-making was assessed using a scale adapted by Tyler and

Blader (2000), composed of four items, to be answered on seven-point Likert-type agreement scales ranging from one ('strongly strongly disagree') to seven ('strongly agree'). One example item: "I feel able to influence the decisions made in my organization".

To measure the work engagement, the short Brazilian version of the Engagement at Work Scale (Ferreira et al., 2016) was used, adapted from the Utrecht Work Engagement Scale (UWES). The instrument consists of nine items, to be answered on seven-point Likert frequency scales, ranging from one ('never') to seven ('always'). Example item: "I feel happy when I work hard".

The Work Role Performance Scale by Griffin et al. (2007) was used to measure the performance of work roles. The total instrument consists of twenty-four items, to be answered on seven-point Likert frequency scales, ranging from one ('never') to seven ('always'). In this study, only six items were used, corresponding to the individual task performance and team performance subscales. Example item: "I completed my tasks using standard procedures".

The data collected daily adopted the same instruments as the general questionnaire, but with instructions and adapted items, so that the participants could answer about their feelings and behaviours experienced at the end of each workday. The example of the item adapted from the daily task complexity was: "The tasks I performed in my work today were difficult to understand". The item adapted from the daily work role ambiguity scale was: "Today, in my work, I was not sure of the degree of authority I have." The example of the item adapted from the scale of participation in daily decision-making was: "Today, in my work, I felt able to influence the decisions made in my organization". The item adapted from the daily work engagement scale was: "Today, in my job, I felt happy when I was working hard." The example of the item adapted from the daily work role performance scale is: "In my work today, I completed my tasks using standard procedures".

Data analysis

The data had a hierarchical structure that aggregated daily evaluations (intraindividual) by individual (interindividual). To analyse these data, we used multilevel modelling (Hox et al., 2017) and path analysis. The data were analysed using Mplus software version 7.11. The parameters of the models were estimated using the Robust Maximum Likelihood (RML) method, which was robust to the violation of the assumption of normal data distribution. The research hypotheses were tested in four steps. In the first step, an empty model was tested in which the variance of the dependent variable (role performance) was separated by level of analysis. The second step consisted in inserting the time variable into the intraindividual level. Next, the control variables (gender, education, work experience in the organization), independent variables (role ambiguity, participation in decision-making and task complexity) and the random regression coefficients were inserted in the relation between time and the intraindividual variables. Finally, in the third step, the mediating effect of work engagement between the independent variables and the role performance was tested.

Results

Factorial Scores, Descriptive Statistics and Preliminary Analyses

In order to estimate the factorial scores of each scale, we performed confirmatory factor analyses of each instrument and on every day of the week. Therefore, for each scale, five factorial scores of the same subject were estimated.

Based on the confirmatory factorial analyses, the discriminant validity of each scale could also be evaluated on each day of the week. The role ambiguity scale adjustments varied between: CFI = .95 to .99, TLI = .92 to .99, RMSEA = .09 to .19. Regarding the complexity of the task, the

adjustments were: CFI = .95 to .99, TLI = .85 to .96, RMSEA = .24 to .46. The adjustments of the scale of participation in decision-making were: CFI = .97 to .99, TLI = .91 to .98, RMSEA = .35 to .45. The engagement scale presented adjustments ranging from: CFI = .98 to .98, TLI = .97 to .98, RMSEA = .22 to .28. Finally, the role performance scale obtained CFI = .94 to .98, TLI = .91 to .96, RMSEA = .27 to .45.

The standard factor loadings were also calculated for each of the scales and on each day of the week. The average loading of the role ambiguity scale ranged from .69 to .80, the task complexity from .77 to .89, participation in decision-making from .87 to .83, work engagement from .87 to .92 and the mean factor loadings for role performance ranged from .82 to .88.

In table 1, the means, standard deviations and correlations of the study variables are displayed. Correlations below the diagonal are at the interindividual level ($N = 116$), while the correlations above the diagonal are at the intraindividual level ($N = 564$, considering the withdrawal of the 16 omissions). It was observed that the means were close to 0, justified by the use of the latent scores. In addition, the standard deviations were equal to 1 as the latent variance is estimated with values close to 1.

At the interindividual level, the results show that none of the sociodemographic variables (sex, company time and education) were significantly associated with the research variables, so they were not reported in table 1. Work engagement correlated with all research variables (at both levels), except for the task complexity. This, in turn, presented a positive correlation with the role ambiguity. In addition, it was observed that the correlations were low, which, in a way, was already expected because the variance was separated by levels of analysis. Thus, decreasing the variance tends to decrease the effect size of the correlations.

Table 1
Means, standard deviations and correlations

	M	DP	1	2	3	4	5
1 Role ambiguity	.01	1		.11*	-.11*	-.13*	-.09*
2 Task complexity	-.01	1	.03*		-.01	.03	-.04
3 Participation decision-making	.01	1	-.01	.03*		.22*	.06
4 Work engagement	-.01	1	-.04*	.01	.07*		.18*
5 Role performance	-.04	1	-.04*	-.03	.03*	.08*	

Obs. Number of workers = 116; The lower diagonal displays the correlations among the variables at the intraindividual level. The upper diagonal shows the correlations at the interindividual level. * $p \leq .05$.

Hypothesis test

The models implemented in MPlus were tested using the random regression coefficients (or slope as outcome) in the relationship between time and all intraindividual variables. The research hypotheses imply that part of the variance in the role performance can be explained by daily variations in the individual and among individuals.

Thus, we first tested an empty model in which the variance of the dependent variable (role performance) was separated by analysis level. It was verified that the performance variance was significant at both levels of analysis and the intraclass correlation was high (.58), which justifies the clustering of the performance variance.

In model 1, the time variable was inserted at the intraindividual level, according to the multilevel model of repeated measures (Hox et al., 2017). It was observed, however, that time did not interfere in performance. Nevertheless, the maintenance of this parameter in the model is important for the variance control at the intraindividual level. On the other hand, there was variation in the engagement at the interindividual level.

In model 2, the independent control variables were inserted, along with time. There was no influence of time on the independent variables. Regarding the control variables, when inserted simultaneously in the model, only education affected the work performance. When the variables sex and company time were removed, however, education did not present a significant relation to performance

either. Thus, control variables were removed from subsequent models.

In model 3, we tested the direct effects of the explanatory variables on role performance. The ambiguity had a significant and negative influence at both levels, so that hypotheses 2a ($b_{within} = -.27$; $p < .01$) and 2b ($b_{between} = -.42$; $p < .01$) could be confirmed. The task complexity presented a significant and negative association with performance only at the intraindividual level, which confirms hypothesis 4a ($b_{within} = -.14$, $p < .01$), but does not confirm hypothesis 4b ($b_{between} = .01$; $p > .05$). Participation in decision making showed a significant and positive association with performance only at the intraindividual level, which confirms hypothesis 6a ($b_{within} = .16$; $p < .01$), but did not confirm hypothesis 6b ($b_{between} = .03$; $p > .05$).

In model 4, the mediating effect of work engagement between the independent variables and role performance was tested. In all mediation tests, the engagement showed a significant relationship with performance at both levels of analysis ($b_{within} = .31$, $p < .001$; $b_{between} = .27$, $p < .001$), confirming hypotheses 7a and 7b. The ambiguity of roles had a significant negative relationship with engagement at both levels, which permitted confirming hypotheses 1a ($b_{within} = -.27$, $p < .01$) and 1b ($b_{between} = -.57$, $p < .001$). The direct effect of these variables at the interindividual level presented borderline significance. In this sense, mediation, at the interindividual level, is borderline between total and partial; at the intraindividual level, the mediation was partial.

Still in model 4, the task complexity was not significantly related with the engagement ($b_{within} = .05, p > .05$; $b_{between} = .08, p > .05$), which does not confirm the hypothesis of the engagement in the relation between complexity and performance (non-confirmation of hypotheses 3a and 3b). Regarding participation in decision-making, there was a significant and positive relationship with engagement at both levels, which permitted confirming hypotheses 5a ($b_{within} = .35; p < .01$) and 5b ($b_{between} = .45, p < .001$). After inserting the mediating variable engagement in the model, the direct relationships between participation in decision-making and performance were no longer significant at both levels of analysis ($b_{within} = .06, p > .05$; $b_{between} = -.06, p > .05$).

Thus, the relationship between participation in decision-making and performance was totally mediated by engagement at the intraindividual level. At the interindividual level, however, the effect of the indirect variable on the direct variable only exists through the intermediation of engagement. Therefore, at the intermediate level, this is a relation of indirect effects, but does not represent mediation, as the direct effect was not significant.

These results partially support hypotheses 8a and 8b. All regression coefficients presented so far were non-standardized. To assist in the interpretation of effect sizes, figure 2 shows the relationship model between the variables and the standardized regression parameters.

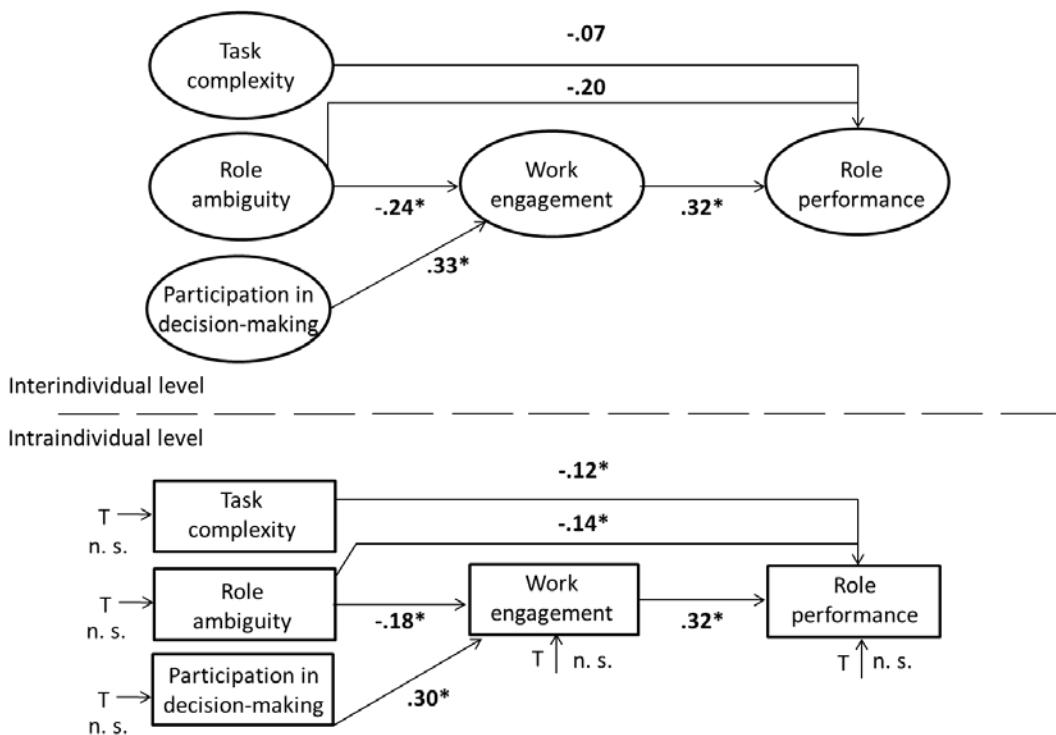


Figure 2

Mediating effect

Obs. * significant ($p \leq .05$); n. s. = not significant.

Discussion

In this study, the intraindividual and interindividual variations in work engagement were investigated and the predictive role of an obstacle demand (role ambiguity), a

challenging demand (task complexity) and a work resource (participation in decision making) in engagement was analysed, as well as its influence on role performance. Additionally, the mediating role of work engagement in the relation among demands,

work resource and performance was investigated.

In the confirmatory factor analyses, it was observed that the models had low adjustment indices. This is due to the fact that the same scales, with the same items, were applied to the same individuals over five consecutive days. Therefore, it would not justify presenting different structures for different days of the week. Also, factor loadings were adequate for every day of the week.

In addition, the findings indicated that time did not interfere in the variation of the engagement, that is, there was no variation in this construct at the intraindividual level. Nevertheless, there was variation at the interindividual level. Despite the advances in studies that investigate engagement based on intraindividual variations (Hertel & Stamov-Roßnagel, 2013), the findings of this study were in line with the first definitions of the phenomenon, considered as a psychological trait or positive and fulfilling work-related mental state (Schaufeli et al., 2002).

Longitudinal studies have also aimed to investigate the stability of the constructs. Brauchli, Schaufeli, Jenny, Füleman and Bauer (2013), in an investigation that involved three phases (from 2008 to 2011), observed that, compared to the negative aspects of work (demands and burnout), the positive aspects (work resources and engagement) were more stable over time. The authors present several arguments for this occurrence. It should be emphasized, however, that negative aspects of work seem to be more strongly determined by external forces, while positive aspects are more independent of work situations, especially when considered in conjunction with personality traits.

Regarding the intraindividual variations, it was observed that the role ambiguity presented a significant and negative relation with engagement and role performance. These findings are in line with the theoretical assumptions that obstacle demands tend to prevent positive outcomes in the context of work, being related to stressful aspects of the work environment (Crawford et al., 2010), thus relating negatively to positive constructs

(Fisher & Gitelson, 1983). In this case, the lack of information needed to perform work tasks interfered negatively in engagement and work performance (Kahn et al., 1964).

Task complexity presented a significant association only with performance, although this influence was negative. Task complexity has been considered a challenging demand in European and American studies (Crawford et al., 2010; Christian et al., 2011), considering that complex tasks require the use of high-level skills and are more mentally challenging, which may contribute to positive motivational outcomes (Edwards et al., 2000). In Europe, however, there is the predominance of an individualistic culture, which values competitions in the work environment, as well as challenging activities. In Brazil, a collective culture predominates, in which there is little competition among the members of the organization and low perception of the tasks as being challenging (Ferreira et al., 2006). In this sense, the research participants, composed of a sample of Brazilian workers, may not have perceived the complex tasks as challenging, but rather as obstacles, due to their low valuation of the competition, which may have been responsible for the negative impact of task complexity on the performance of work roles and for its non-influence on work engagement.

Participation in decision-making exercised positive and significant influence on engagement and performance. These findings are in line with the JD-R theory, which presupposes the influence of work resources (e.g. autonomy) on engagement and organizational outcomes (Bakker & Bal, 2010; Bakker et al., 2014; Bakker & Demerouti, 2017; Christian et al., 2011; Schaufeli, 2017).

Work engagement also had a positive influence on role performance. This result was to be expected, as performance has been a frequent consequence of work engagement (Alessandri et al., 2015; Bakker & Bal, 2010; Christian et al., 2011).

At the intraindividual level, it could also be observed that engagement partially mediated the influence of role ambiguity on performance, while fully mediating the

relation between participation in decision-making and performance. In that sense, the effect of the participation in decision-making on role performance can only be explained through work engagement. As Bakker (2014) argues, the fluctuations in engagement can be due to the daily work demands and, when the individuals have access to resources, these can act as motivators in search of positive work outcomes. In addition, various studies have demonstrated the mediating role of work resources (Airila et al., 2016; Rich et al., 2010). In that sense, the participation in decision-making was an importance resource to face the demands (ambiguity and task complexity) and contribute to motivational results.

The interindividual variations were observed through the direct and negative influence between role ambiguity and engagement, while the participation in decision-making had a positive influence on the engagement. This, in turn, exercised a positive and significant influence on role performance.

Contrary to the intraindividual level, a borderline (total-partial) mediation of the engagement between role ambiguity and performance was observed. There was also an indirect effect of participation in decision-making on role performance. This last finding reveals that, at the interindividual level, the influence of participation in decision-making on role performance is best explained when the mediation of work engagement is present.

Conclusions

Findings indicate that role ambiguity constituted a significant and negative predictor of engagement and performance, while participation in decision-making was characterized as a positive predictor of both constructs. Task complexity, in turn, was a negative predictor of performance. Nevertheless, the size effects were small to median (up to .32), in both level of analysis. This is consistent with other previously studies where engagement and performance shared only a small part of their variances (Schaufeli

& Taris, 2014; Xanthopoulou et al., 2008). Furthermore, effect sizes also point out to practical implications: enhancing the participation in decisions and engagement might impact deeper in performance scores than the attempts to reduce the role ambiguity, although this impact is expected to be up to 10% ($\sim .32^2$). Moreover, it can be concluded that engagement is a motivational construct in the form of a trait influenced by contextual variables, which exerts a direct influence on performance, besides acting as mediator between situational phenomena and such result, as outlined in the JD-R model.

Theoretical contributions

This study offers an important theoretical contribution in discussing the motivational construct of engagement from the state perspective. Thus, intraindividual variations can be observed along the days of the week. Using the JD-R theory, the influence of certain daily demands and resources on work engagement and role performance could be tested. The hypothesis that task complexity would act as a challenging demand was not confirmed in this research, indicating that this variable acts as a challenge in individualist contexts, and not in collectivist cultures like Brazil.

In addition, this is the first Brazilian research to study engagement as a state. As pointed out in Xanthopoulou et al. (2008) and Bakker et al. (2014), diary studies are still recent, so further investigations of this kind are needed to investigate the role of engagement in individuals' job context.

Limitations and future research

The research comes with a number of limitations. Causal relationships were not investigated, as this was not an experimental study. The sample was relatively small, indicating little interindividual variability. Few variables were inserted into the research model, making it less sophisticated. No personal resources were included in the test model.

New studies should seek to replicate these results in other samples, aiming to investigate the variables studied here, mainly to verify the role of task complexity in relation to engagement. Future research should also seek to include other demands, in order to verify differences between challenging and obstacle demands. Personal resources should also be studied along with the demands and work resources. In addition, future research should expand the study sample, exploring different work environments, with employees from different sectors and instruction levels.

Practical implications

The study suggests that work resources as well as engagement are beneficial to employees and organizations, as they contribute to a better work role performance. Brazilian organizations can benefit from these findings and gain competitive advantage by intervening in the job context as a way to encourage individuals to connect daily to their work activities.

To do so, they should clarify the roles of each employee, making sure that the Human Resources sector adopts practices such as integration, training and development, evaluation and reward, among others, as a way to offer information on job roles. In addition, line managers should seek to encourage participation in decision-making, generating more autonomy for the employees. Thus, organizations contribute to individuals being more likely to engage in their work activities and to achieve positive outcomes, such as work performance.

Authors' participation:

- a) Conception and design of the work; b) Data acquisition; c) Analysis and interpretation of data; d) Writing of the manuscript; e) Critical review of the manuscript.
- R.S.C.CH. has contributed in a,b, c,d, e; M.C.F. in a,c,d, e; F.V. in c, d, e.

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