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Work redesign: Intervention based on the Social Information Processing Approach

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Keywords:
intervention assessment;
work design;
network analysis;

Abstract

The objective of this study was to measure the impact of a work redesign intervention based on the social information processing approach in an emotional work context. The research used a quasi-experimental panel design with pretest and post-test measurement, with intervention and control groups. A hundred and one health professionals participated in the study. Data were collected in 15-month intervals and 12 months after the intervention. We analyzed intergroup, intragroup, and psychological networks differences. Intergroup and intragroup analyses showed differences in the Information Processing category. The psychological network analysis suggested it was a protective, promising, and low-cost intervention for work redesign. The use of dynamic psychological network measures for intervention studies was discussed.

Redesenho do trabalho: Intervenção baseada no paradigma de processamento de informação social

Palavras-chave:
avaliação de intervenção;
desenho do trabalho;
análise de rede

Resumo

O objetivo deste trabalho foi medir o impacto de uma intervenção de redesenho do trabalho a partir da proposta de processamento de informação social em um contexto de trabalho emocional. A pesquisa utilizou delineamento quase experimental de painel em dois momentos de coleta de dados, antes e depois da intervenção, em dois grupos, intervenção e controle. Participaram da pesquisa 101 profissionais de saúde com intervalos de 15 meses entre coletas de dados e 12 meses após a intervenção. Foram analisadas diferenças entre-grupos, intragrupos e nas redes psicológicas. Os resultados com as análises entre-grupos e intragrupos apresentaram diferença na categoria Processamento de informação. A análise de rede psicológica sugere que a intervenção foi protetiva, promissora e de baixo custo para o redesenho do trabalho. Discute-se o uso de medidas dinâmicas de rede psicológica para estudos de intervenção.

Rediseño del trabajo: Una intervención basada en el paradigma del procesamiento de la información social

Palabras clave:
evaluación de intervención;
diseño del trabajo;
análisis de redes

Resumen

El objetivo de este trabajo fue mensurar el impacto de una intervención de rediseño del trabajo a partir de la propuesta de procesamiento de información social en un contexto de trabajo emocional. La investigación utilizó un diseño casi experimental de panel con dos momentos de recogida de datos, antes y después de la intervención, en dos grupos, intervención y control. Participaron de la investigación 101 profesionales de salud. Los datos fueron recolectados en un intervalo de 15 meses y 12 meses después de la intervención. Se analizaron diferencias entre grupos, intra-grupo y de redes psicológicas. Los resultados del análisis entre grupos e intra-grupo mostraron diferencias en la categoría Procesamiento de información. El análisis de red psicológica sugiere que la intervención fue protectora, prometedora y de bajo coste para el rediseño del trabajo. Se discute el uso de medidas dinámicas de red psicológica para estudios de intervención.

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In Brazil, civil service is perceived as unsatisfactory (CNI & IBOPE, 2011). In 2016 the Brazilian population perceived the civil services quality as lower than the ideal considering the amount of taxes paid (CNI, 2016). Moreover, there was the challenge of improving civil service performance in a context of care-related, emotional works (pink collar), which are typically low-enriched as happens with some professional categories in the fields of education and health (Boyd, Hayward, Tuckey, Dollard, & Dormann, 2015; Ferreira et al., 2017; Koopmans et al., 2012; Parker, 2014). In addition, efforts to improve performance are understood as one-time and relatively standardized interactions (Ryan & Ployhart, 2013).

The work redesign focused on maximizing potential is one of the strategies currently used to improve work performance (Parker, 2014; Parker, Knight, & Ohly, 2019; Parker, Morgeson, & Johns, 2017). Work design could be defined as the content and organization of tasks (Parker et al., 2017) made up different characteristics: task, knowledge, social and contextual (Morgeson & Humphrey, 2006) ones. In Brazil we also find that differentiation (Borges-Andrade, Peixoto, Queiroga, & Pérez-Nebra, 2019). Task characteristics are composed of variables that foster the task accomplishment itself, as well as of more classic variables of work design measures (Hackman & Oldham, 1975). Knowledge characteristics gather variables related to the cognitive demand to accomplish the task (Morgeson & Humphrey, 2006). Both social and contextual work characteristics are external to the relationship between individuals and their tasks, between the individual and the relational environment and the context in which the task is accomplished.

Surveys related to work design focused on improvement of its motivational potential follow several paradigms. Most surveys are focused on fulfillment of needs, known as work characteristics models that are based on the principle of work enrichment (Parker et al., 2019). In other words, workers have some need that will be fulfilled by some work characteristic. Once the need is fulfilled, the attitude towards work improves and thus lead to behaviors compatible with such attitudes (Salancik & Pfeffer, 1978).

For contexts of strongly emotional work, such as that of health professionals, models of fulfillment of needs for the redesign work seem to be limited. On one hand, work enrichment does not prevent the occurrence of routine tasks required to the proper delivery of the service. On the other hand, as it is a work with strong emotional and relational component (Boyd et al., 2015; Buttigieg & West, 2013; Ferreira et al., 2017; Grandey, 2000; Kiss, De Meester, Kristensen, & Braeckman, 2014; Vilelas, 2013), changes on the objective and individual characteristics of the position and changes on the processes of social information and sense-making deserve attention.

Other paradigms have been formulated as alternative to that of fulfillment of needs. Contextual paradigms aim to describe how context affects attitudes, perceptions and behaviors. Social context and the consequences of behaviors are variables that, together, make up the ground to the proposal of social information processing (Salancik & Pfeffer, 1978). The basic premise of this information processing paradigm is that social context drives individuals to conform and adjust their attitudes, behaviors and beliefs. Although this paradigm is prominent for emotional professions, it lacks in-depth analyses and there are few tests on its evidence. Social environment is an important source of information and gives tips on how events should be assessed and construed, as well as on which attitudes and opinions could be expected (Salancik & Pfeffer, 1978; Schachter & Singer, 1996).

Social context affects attitudes by providing sense-making, and driving attention to given information (Salancik & Pfeffer, 1978). Considering that work is a complex stimulus, the lack of feedback from it leads to doubtful judgments typically based on the social information available (Festinger, 1954). Moreover, in work with strong social component, as that of health professionals, feedback from other individuals is a core element to properly assess the very nature of the work.

Social influence on judgment takes place through different mechanisms: (a) it provides information on how appropriate attitudes are; (b) it suggests causal attributions; (c) workers tend to agree with their fellows to fit into their context, even more in cultures like the Brazilian culture, and the replication of such agreement ends by persuading the worker; (d) it highlights different aspects of the work and draws attention to a given characteristics, leading to different judgments; (e) it gives tips on the interpretation and meanings built about events; and, (f) it influences how individuals understand their needs (Briñol, Petty, & Wagner, 2012; Petty & Briñol, 2011; Salancik & Pfeffer, 1978; Schachter & Singer, 1996; Torres & Pérez-Nebra, 2015).

Therefore, the objective of this work was to measure the impact of a work redesign intervention in the light of an approach of social information processing. To that a panel design was used in a quasi-experimental field study with control group (CG) and intervention group (GI) (Parker et al., 2019).

Considering the nature of the task, the work redesign aimed at improving the perception on work characteristics based on a positive processing of social information. The proposal is that the perceptions of a given work dimension could spill over other surrounding dimensions (Geurts & Demerouti, 2003). This phenomenon is known as horizontal spillover effect (Sirgy, Efraty, Siegel, & Lee, 2001). Therefore, changing one dimension could affect the others in a dynamic and longitudinal way (Bringmann, Ferrer, Hamaker, Borsboom, & Tuerlinckx, 2018; Bringmann, Lemmens, Huibers, Borsboom, & Tuerlinckx, 2015; Hamaker, Asparouhov, Brose, Schmiedek, & Muthén, 2018). Such spillovers may be either positive (Hanson, Hammer, & Colton, 2006; Sirgy et al., 2001) or negative (Groth & Grandey, 2012; Stoetzer, Ahlberg, Bergman, Hallsten, & Lundberg, 2010).

Two types of strategies were employed to analyze the effect of the intervention. A more conventional strategy that analyzes both intragroup (before and after the intervention) and intergroup (control and intervention) changes. Moreover, this study incorporates the analysis of dynamic networks of relationship among the several work characteristics. The field of study in dynamic systems is recent in psychology, and emerged to describe the complexity of human behaviors. It has been studied through psychological networks (Epskamp, 2017). Psychological networks are unique models, since they are made up by variables (nodules) rather than by concrete entities such as individuals, publications, among others. Networks allow a dynamic conceptual interpretation of results and explain co-occurrence based on the links between variables. Multi-varied dependence of variables is understood through its visualization and estimation. It allows assessing the most important nodules that are estimated by the centrality of the variables. Moreover, it allows understanding different dynamics and spillovers in its setup, estimated by the intensity of the relationships between them (Bringmann & Eronen, 2018; Cramer et al., 2016; Epskamp, 2017; Fonseca-Pedrero, 2018). Applied to this context: a positive and strongly connected network of assessments of work design works in a protective way to the individual: activating one nodule of the network it positively and intensively spills over the other nodules. As such, the more intensive the relationships between positive perceptions of the work design, the more protective the network is.

Before planning the intervention, the researchers consulted the Brazilian literature on tests of interventions in work design and, more broadly, in organizations. The survey resulted in few works reporting interventions in organizations (Araujo, Busnardo, Marchiori, Lima, & Endlich, 2002; Isosaki, Cardoso, Glina, Pustiglione, & Rocha, 2011; Neiva & Paz, 2012; Pereira & Santos, 2012; Ribeiro, Martins, & Mossini, 2012; Santos, Fanganiello, Paparelli, & Oliveira, 2008), or in work design (Carrión, López, & Gutiérrez, 2015; Guimarães, Mauro, Mendes, Melo, & Costa, 2005; Lavarda & Lavarda, 2015; Marçal & Filho, 2004). The existing works are mainly based on qualitative methods (Araujo et al., 2002; Murta & Tróccoli, 2004; Pereira & Santos, 2012; Ribeiro et al., 2012), except for Neiva and Paz (2012), with cross-sectional designs. This unveils a gap in both national and international literature on this topic.

This study intends to propose an intervention using the social information processing proposal in the context of emotional work in a public hospital. It was based on the premise that presenting positive social information (Ragins & Button, 2007; Warr, 2011; Wilson, Centerbar, Kermer, & Gilbert, 2005) would positively affect other work characteristics and foster more intense positive state. In operational terms, the proposal was to have the teams describing positive aspects of their co-workers' performance both related to tasks and in the context. Therefore, three hypotheses guided the study:

Hypothesis 1 (H1). IG will show improved perception of work characteristics in comparison with the CG.

Hypothesis 2 (H2). IG will show improved perception of the work characteristics over time.

Hypothesis 3 (H3). IG will build more intensive and protective network of relationships among the work design dimensions over time.

Method

Participants

Every hospital team with more than four members was invited to participate in the work, due to potential difficulties concerning the future feedback to the team. Therefore, teams self-declared interested in participating (flow available in Figure 1, Procedure section). The survey comprised 101 professionals of different areas of a hospital located in Brasilia, of which 33 individuals were assigned to the IG (four teams – Therapeutic Care Center, Nutrition, Social Service and Joint Shelter ward) and 69 participants were assigned to the CG (14 teams). Unfortunately, organizational limitations prevented us from working with random teams in the IG. All participants were civil servants working on the same maternity hospital. The sample was mainly composed of women (98%) with education level ranging from high school to Doctor's degree. In terms of professional category, participants were social assistants, nursing clerks, nurses, physiotherapist, speech therapists, physicians – gynecologist, obstetrician, pediatrician, and psychiatrists -, nutritionists, psychologists, nutrition technicians, nursing technicians and occupational therapists.

Instruments

Brief and translated version of Morgeson's and Humphrey's (2006) Work Design scale, with 5-point agreement scale. The overall fitting of the scale was acceptable (x2 = 1062, gl = 288, relation x2/gl= 3.69; GFI = 0.90, TLI = 0.88; RMSEA=0.06). The characteristics accessed were Autonomy (general factor, ω = 0.63), Task Meaning (ω = 0.69), Feedback from job (ω = 0.75), Information Processing (ω = 0.65), Task Variety (ω = 0.83), Social Support (ω = 0.69), Feedback from Others (ω = 0.82), Physical Demands (ω = 0.85) and Work Conditions (ω = 0.61) with three items to each dimension, in a 1 to 5 scale. Socio-demographic data questionnaire.

Notes on a field diary were also used as auxiliary instrument to help understanding the results throughout the intervention process.

Procedure

An intervention on work redesign through positive social feedback was performed. A panel design of two measurement moments – one prior to the intervention and other after the intervention with 1-year interval between assessments – was used to assess the intervention. Moreover, a quasi-experimental design with IG and CG in the hospital context (flow shown in Figure 1) was used.

Time 1: diagnosis and intervention.

Diagnosis of the work design. Application of the questionnaire to the CG and IG.

Intervention. Phase 1, feedback sessions about the assessment of each teams' needs, introducing the scale elements, and explaining each variable and result. The feedback sessions with teams focused on positive and functional aspects. Phase 2, a positive assessment dynamic was administered to the teams, which started by gathering the number and name of employees in each team. On a team room, PET bottles were organized bearing the name of each employee and placed on a site easily accessible to each team, jointly with a poster with general information to the employees: please describe three overall positive aspects about your co-worker, and three positive aspects about what they do well in terms of work tasks. The objective was to describe context and task-related performances. The participants were given envelopes with piece of papers in the same quantity as the number of participants in each team, so that all co-workers could receive positive descriptions.

The criterion to select PET bottles was as follows: the proposal was that people could easily put the pieces of paper in the bottles, but had difficulties to pick them. Several surveys suggest that emotional contexts are susceptible to gossip and complex interpersonal relationships (Kiss et al., 2014). Having this context clearly defined, we tried to prevent people from poking around in the comments. Moreover, this method could allow estimating the number of comments in each bottle, and if teams needed encouragement or support from leaderships to increase or expand their adherence to the intervention.

Bottles were collected around one week later, and the pieces of paper were placed in envelopes labeled with the name of the respective employees. The content of the piece of papers was read and the negative comments (N=3) were removed to keep only the descriptions compliant with the proposal, i.e., positive. A feedback session on the positive assessment was held with the team members. In that session, the envelopes were given to each employee. There was time for reading, debating and brainstorming in order to understand the employees' perception about the dynamic performed, and to give an overall feedback on the activity.

Time 2. Assessment one year after the intervention. The Work Design Scale was applied again.

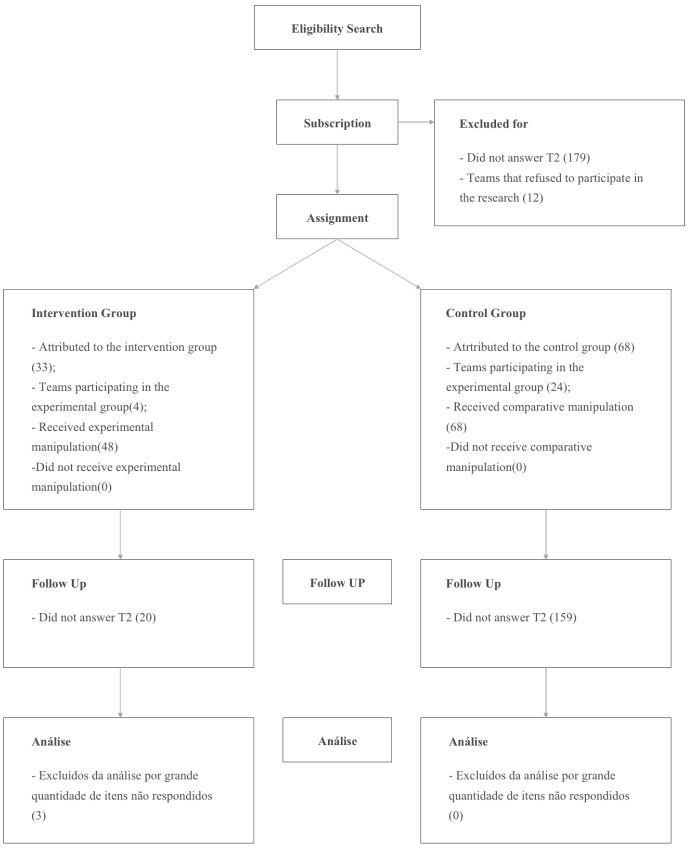

Figure 1. Flow of participations throughout the intervention stages

Ethical aspects

The project was approved by the Committee of Ethics in Research of the Higher School of Health Sciences (CEP Fepecs: protocol 13145 approved on November 5, 2015).

Data Analysis

Fitting and reliability analyses were performed on the scales. Fitting analysis was performed using the R software package Lavaan (Rosseel, 2014) while omega-based reliability analysis was performed in Excel, as indicated (McNeish, 2018). To test H1 and H2, we analyzed the intergroup and intragroup differences between CG and IG at different times (Time 1, T1 and Time 2, T2). Data were analyzed in the SPSS statistical software using the comparison between means in T2 (one-way anova) (Field, 2006) and the dependent t test (Field, Miles, & Field, 2012; Newsom, 2012) was used for repeated measures. H3 was tested through the analysis of the dynamic of relationships between the different characteristics of work, based on the analysis of psychological network. To that, we used the R software in packages qgraph (Epskamp, Borsboom, & Fried, 2018; Epskamp, Cramer, Waldorp, Schmittmann, & Borsboom, 2018; Fonseca-Pedrero, 2018). The R syntax used is shown in the appendix.

Results

The analysis of intergroup comparison had two objectives. The first one was to compare groups at T1 in terms of work design and testing likely differences. In general, data in Table 1 do not show intergroup differences to T1, except for Work feedback and Physical demands. The second objective was testing the H1 of work that suggested significant and positive difference to the IG against the CG. This hypothesis was ruled out as there is no significant intergroup difference at T2 (means are shown in Table 2).

Table 1
Intergroup comparison at T1 and T2

	T1[a]		T2[b]	
Work Design Characteristic	*F*	*p*	*F*	*p*
Task Characteristic				
Autonomy	1.08	0.30	0.82	0.37
Task Significance	1.02	0.32	0.00	0.97
Feedback from Job	9.14	0.03	1.26	0.26
Task Variety	1.00	0.32	0.13	0.71
Knowledge Characteristics				
Information processing	0.44	0.19	3.32	0.07
Social Characteristics				
Social Support	0.67	0.41	0.03	0.86
Feedback from Others	0.00	1.00	0.33	0.57
Contextual Characteristics				
Physical Demands	7.58	0.01	3.43	0.07
Work Conditions	0.34	0.56	1.43	0.24

Note. Remark: [a]n=33; [b]n=68

The overall result of the intragroup comparison is the inexistence of difference to the IG; the only difference was found when the task characteristic magnitude was reduced. For the CG, no variable reported significant difference. It was also observed that variables reported correlation between times, except for Autonomy and that the IG reported no significant relation in Physical demands.

Knowledge characteristic was reduced in both samples, but was significant in the IG and not significant in the CG. The other characteristics presented less clear variations.

H3 suggested that the intervention group network would be more intensive if compared to the control group and the network dynamic analysis. Figure 2 shows the result of networks and the intervention and control groups at different times. The IG presented an increase in the relationships of some variables and suppression of negative relationships, while in the CG these variables were weakened, supporting H3. Specifically, the Contextual Characteristics changed their relationship, presenting negative relations at T1 to both groups. At T2 it remains negative to the CG, but becomes independent in the IG. In the CG-T2 the negative relationships between Contextual Characteristics and some Task Characteristics increased.

Figure 3 shows the variables centralities. Literature suggests that the strength of the variable to psychological networks is the most meaningful element to this kind of network (Bringmann, Elmer, et al., 2018). Moreover, is shows that network visual inspection is not enough and could bias the analysis (Fonseca-Pedrero, 2018). So, although dynamics seem different when visually observed, the major differences at T1 were in Autonomy and Task variety. Although at T2 the whole dynamic of strengths was different both to the IG and the CG, in general the IG presented strongly linked nodules and other independent nodules, but there were differences especially in Information Processing, Autonomy and Social Support.

Table 2
Comparison of the means of employees' perceptions in the intervention group and control group regarding the variables of Work Design Pre and Post-Test, and correlation between variables in different times.

	Intervention Group[a]				Control Group[b]				General Sample
	T1	T2			T1	T2			
WDQ categories	Means (DP)	Means (DP)	*t*	*r*	Means (DP)	Means (DP)	*t*	*r*	*r*
Task Characteristic									
Autonomy	3.89 (0.96)	4.11 (0.78)	0.99	-0.08	4.07 (0.77)	3.96 (0.82)	-1.05	0.32**	0.16+
Task Significance	4.05 (0.66)	4.18 (0.69)	1.01	0.40*	4.19 (0.65)	4.17 (0.77)	-0.16	0.42**	0.41**
Feedback from Job	3.47 (1.02)	3.74 (0.90)	1.13	0.04	3.95 (0.82)	4.04 (0.86)	-0.87	0.38**	0.27**
Task Variety	4.14 (0.96)	4.30 (0.79)	0.76	0.04	4.35 (0.75)	4.40 (0.74)	0.35	0.18	0.18+
Knowledge Characteristics									
Information processing	3.85 (0.70)	3.96 (0.62)	0.66	-0.05	3.94 (0.69)	3.65 (0.88)	-2.60**	0.29*	0.18+
Social Characteristics									
Social Support	3.68 (1.00)	3.85 (0.90)	1.15	0.60**	3.84 (0.94)	3.88 (0.92)	0.27	0.19	0.33**
Feedback from Others	2.67 (1.21)	2.96 (1.09)	1.27	0.34*	2.67 (1.21)	2.82 (1.20)	0.97	0.42**	0.40**
Contextual Characteristics									
Physical Demands	2.48 (1.16)	2.72 (1.07)	1.19	0.50**	3.14 (1.10)	3.18 (1.21)	0.25	0.39**	0.45**
Work Conditions	2.87 (0.98)	2.79 (1.16)	-0.33	0.16	2.99 (0.98)	3.06 (1.05)	0.60	0.50**	0.39**

Remark: an=33; bn=68; +p<0.10; *p<0.05; **p<0.01

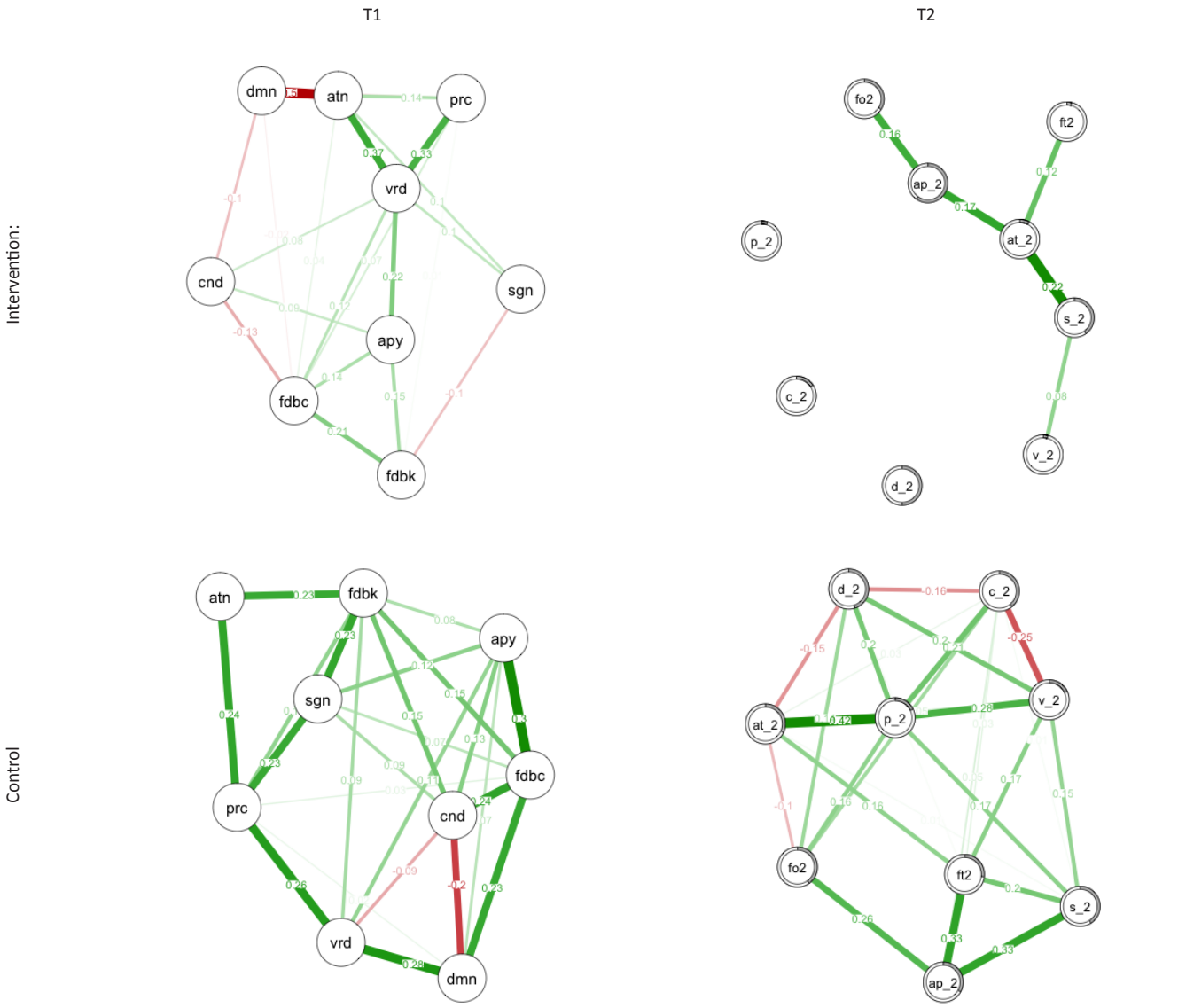

Figure 2. Estimated networks of the control and intervention groups at Time 1 and Time 2 of the Work Design variables. Remark: T1: atn = Autonomy; apy = Social support; cnd = Work conditions; dnm = Physical demands; fdbc = Feedback from the job; fdbk = Feedback from others; prc = Information processing; sgn = Task significance; vrd = Task variety; T2: atn_2 = Autonomy; ap_2 = Social support; c_2 = Work conditions; d_2 = Physical demands; ft2 = Feedback from the job; fo2 = Feedback from others; p_2 = Information processing; s_2 = Task significance; v_2 = Task variety. The graph in each circle represents the magnitude of the correlation between T1 and T2 of each subgroup.

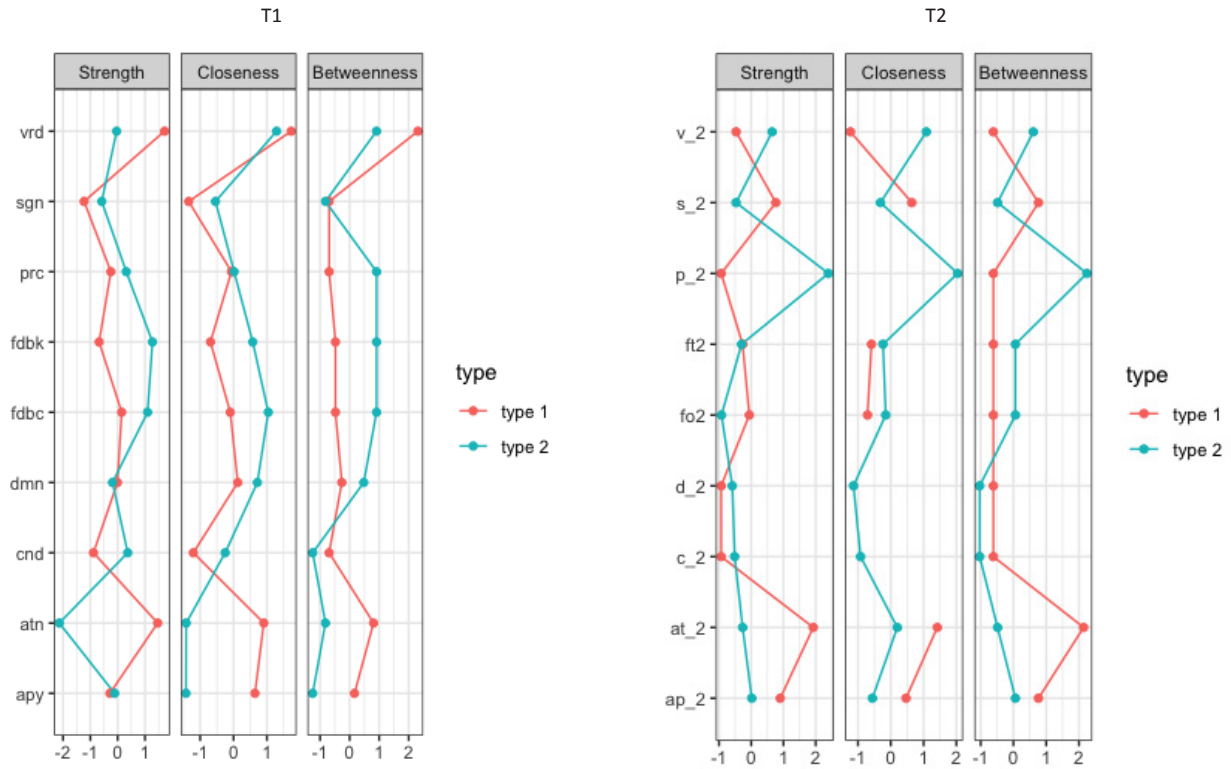

Figure 3. Means centralities at Time 1 and Time 2 for the Work Design variables between the Intervention Group and the Control Group. Remarks: Type 1 = intervention; Type 2 = control. T1: atn = Autonomy; apy = Social support; cnd = Work conditions; dnm = Physical demands; fdbc = Feedback from the job; fdbk = Feedback from others; prc = Information processing; sgn = Task significance; vrd = Task variety; T2: at_2 = Autonomy; ap_2 = Social support; c_2 = Work conditions; d_2 = Physical demands; ft2 = Feedback from the job; fo2 = Feedback from others; p_2 = Information processing; s_2 = Work significance; v_2 = Task variety.

Field Diary

Observations made during the pre-test, intervention and post-test period were recorded on a field diary. The number of participants in the pre-test data collection was more than 10 times higher than that of the intervention; however, few teams and managers adhered to the intervention. Many showed interest, but did not facilitate the operationalization. Some participants participated in the intervention but did not complete the final assessment questionnaire (N=5).

By the time of feedback managers came up with other field issues that could influence the perception of work design, such as: lack of organizational support; overload to some in detriment of others; high number of employees on leave; vertical moral harassment; lack of support to leaderships; training-related difficulties imposed by the institution; managers attempting to implement actions that were not enough not cope with the needs of the team, among others.

During the positive assessment, some singular and common reactions were observed in each team. Prior to the positive assessment, teams showed interest and support to the initiative, but were hopeless regarding the usefulness of the intervention. During the intervention, however, all teams got engaged. During the feedback session of positive assessment, employees were surprised with the feedback they got, since they could not imagine such a positive image perceived by their co-workers. Moreover, they got positive feedbacks that exceeded their expectations. Some employees even got emotional and commented how positive it was to them, bringing about feelings of gratitude. They also reported improved relationship among the team members during the procedure and many weeks later. Some teams (N=2) asked to add the negative feedback to the activity, so they could learn what should be improved in their performance. However, in order to standardize the intervention and considering that it was out of the scope of the proposed objective, the change was not incorporated.

The impacts of the intervention went beyond the participating teams. The researchers' institution got positive feedback. Having heard about the effect of the intervention, other hospital teams requested to have the intervention implemented in their sectors.

T2 disclosed an important change on the organizational structure. The organization moved from a local hospital to a regional reference hospital. In practical terms, the different structure implied providing services not only to local users, but also to users from the region, i.e., increased number of users, more complex cases in technical terms and in terms of support and networking with justice and social assistance. That change took place one month before starting the T2 and affected the overall climate of dissatisfaction and insecurity (11 months after the collection of T1).

Discussion

The objective of this study was to try an intervention to contribute both theoretically and empirically to evidence-based and low-cost interventions on work redesign in the Brazilian civil service, based on the paradigm of social information processing and fostering positive psychological states. The objective is considered to be fulfilled, once the intervention was carried out and subject to longitudinal assessment. Qualitative data extracted from the field diary suggest positive effect of the intervention on the IG, describing changes on the task characteristics, notably on social characteristics. Positive reactions that gave rise to demands for new interventions on the organization. Although these changes could not be observed in the long run – reflected in H1 and H2 (except

for Information Processing) – the network structure shows that the intervention was protective – reflected in H3.

The intensity of Information processing was reduced in the CG (Table 2), but had its centrality significantly increased (Figure 3). The reduction of this variable could be interpreted either positively or negatively. The positive interpretation is a likely perception of reduced cognitive demands in tasks to be accomplished. The negative one is that the work impoverished and is negatively affecting other variables. Nonetheless, this paper faced the difficulty of having no similar studies for comparison and, therefore, offers *post-hoc* explanation on the lack of general support to hypotheses 1 and 2 of the study.

The first two hypotheses were tested with traditional analysis methods, and the techniques employed are highly dependent on the number of participants and analyze variable in isolate. These limitations do not affect the network analyses in particular (Epskamp, 2017). Thus, the first explanatory hypothesis focuses on the limited number of participants, which leads to loss of analysis strength. Another explanation is on the inaccuracy of measures, as the reliability of some were a little below the expected (0.7). Still in the methodological light, the effect size was not intensive enough throughout the time interval (one year). Shorter time intervals are likely to reach intensity enough to be statistically significant.

In addition to the methodological explanations, another hypothesis is found in other mechanisms found throughout the intervention process. Parker (2014) suggests that primary intervention on work design should occur through the change of the characteristics of the work itself. One month prior to the second data collection, the decree changing the hospital structure was published. Therefore, it was an intervention that overlapped the intervention performed in this work, out of the survey control, but that changed both the CG (although not significantly in traditional methods, but evident in the dynamic network analysis) and the IG. That overlapping has probably reduced the magnitude of the participants' perception on work characteristics, considering the kind of impact that, briefly speaking, could be translated into increased demand and reduced control and support.

The reduction of the perception of work characteristics concerns an intra-variable comparison, but the cross-variable relationship seems to have been less impacted. Although this result is coherent with what is found in the literature about networks, where most differences occur mostly on the network structure, rather than on the magnitude of each variable (Bringmann & Eronen, 2018; Bringmann et al., 2015, 2013; Cramer et al., 2016; Epskamp, 2017) some results suggest differences on the magnitude of variables, but not on the network structure (Snippe et al., 2017). Therefore, understanding the difference between these nuances and when and why each difference occurs remains a challenge.

As regards the network analysis, an overall reduction of network relationships intensity was found at T2 for CG, while the opposite occurred to the IG. Some variables reported more negative relationships in CG-T2, while in IG-T2 there is no negative relationship. Both results suggest that the intervention was protective. It is also worth mentioning that in IG-T2 variables that were not related with the others refer to the Contextual characteristics (Physical demands and Work conditions). Although Information process was conceptualized as Task Characteristic and then as Knowledge characteristic (Morgeson & Campion, 2003; Morgeson & Humphrey, 2006, 2008), during the factorial analysis performed in Brazil those factors imbued as the last ranked factors (Borges-Andrade et al., 2019). Jointly, these data may suggest some independence among them. This dynamic relationship should be further investigated.

Moreover, the centrality of a variable describes the most relevant nodule that most affects the other variables (Bringmann, Elmer, et al., 2018; Fonseca-Pedrero, 2018). Autonomy and Task variety were the most central nodules for the IG at T1 and had their intensity changed, as the first one increased and the second one reduced. To the CG, in turn, the structure remained the same to these variables, but with weakened relationships. Task significance and Social support gain centrality in the IG and are reduced in the CG. This dynamic could suggest that Social support, as conceived by Morgeson and Humprey (2006), is protective as it points out the opportunity for developing friendship in the workplace (Andrade & Pérez-Nebra, 2017; Paschoal, Torres, & Porto, 2010; Siqueira, 2008; Sonnentag & Frese, 2013; Stroebe & Stroebe, 1996). In other words, dynamics as those presented here could favor the perception of civilized and supportive relationships among co-workers in the workplace.

In the practical light, the proposed intervention is perceived as a low-cost alternative to be replicated in organizational environments of emotional work. Although the intervention seems promising and easy to apply, it demands replication with larger number of tests and shorter time, so it can be incorporated into and standardized to different contexts. Particularly, the intervention could be applied with dynamic tests to understand to which extent its effect dissipates, and how variables change their relationships over time (Bringmann, Ferrer, et al., 2018; Bringmann et al., 2015; Cramer et al., 2016; Hamaker et al., 2018). Models currently used in the clinical area, but that could be incorporated as tests in organizations. Working at team level in addition to the individual level of analysis to test multi-layer effects is another challenge. The expansion of this survey could allow the theoretical testing of mechanisms involved in the work redesign process based on this paradigm.

In addition to the methodological limitations previously mentioned herein, and those common to self-reported variables, this work also faced design-related limitations. Intervention on work redesign was proposed due to the likely results it entails to workers, to the organization and to those served by it. However, one limitation is that results per se were not measured and should be incorporated in further surveys.

The relevance of this paper and the resulting impacts is of practical, theoretical and methodological nature. In the practical light, Brazil is basically served by public hospitals, but lacks all types of work conditions. This, however, is out of the scope of the work of an organizational psychologist that works in this context. Therefore, a low-cost and easy to implement intervention would be recommended. In the theoretical light, it tested and supported the efficacy of a work redesign based on the paradigm of social information processing. Working with secondary interventions in longitudinal model was innovative. Finally, in the methodological light, the analysis of dynamic psychological networks is a recent approach in psychology, and studying complex and dynamic models is a relevant and pioneering contribution to the organization context as a way to understand the phenomenon.

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Appendix

```
newdata <- Garrafinhas[,571:579] # to select the T2 variables
DataS1 <- newdata [1:33,] # to select the first 32 participants of T2
corMatS1 <- cor(DataS1, use = "pairwise.complete.obs") # partial correlation matrix
Graph_lasso1 <- qgraph(corMatS1, gamma=0, edge.labels=TRUE, graph = "glasso", layout = "spring", tuning = 0.25,
sampleSize = nrow(DataS1)) # Gráfico T1
Graph_lasso1 <- qgraph(corMatS1, gamma=0, edge.labels=TRUE, graph = "glasso", layout = "spring", tuning = 0.25,
sampleSize = nrow(DataS1), pie=c(0.32,0.41,0.27,0.18,0.18,0.33,0.40,0.45,0.39)) # T2 graph including the magnitude of the correlations between T1 and T2
```

Comments: some commands are optional, such as the size of gamma or edge.labels.

The Gamma size sets the criterion for correlations; if correlations are of little intensity, many times the graph is not built. Therefore, value of Gamma should be reduced. We recommend starting with a Gamma of 0.5, but it will depend on the intensity of relationships and sample size. Some parameters are very sensitive to the sample size (Epskamp, Borsboom, et al., 2018). Edge.labels presents the magnitude of partial correlations in the graph. The type of correlation used may change and depends on what one intends to work on the matrix. However, as variable greatly overlap, we would recommend using the standard one, i.e., the partial. Yet, this is not an elementary discussion about the type of metrics to be used (Epskamp, 2017; Fonseca-Pedrero, 2018).

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