

Managing Motivation at the Workplace through Negotiation

Davide CARNEIRO ^{a,1}, Paulo NOVAIS ^a, John ZELEZNIKOW ^b,
Francisco ANDRADE ^c and José NEVES ^a

^a CCTC/Department of Informatics, University of Minho, Portugal

^b School of Management and Information Systems, Victoria University, Australia

^c Law School, University of Minho, Braga, Portugal

Abstract. Recent research shows that our performance and satisfaction at work depends more on motivational factors than the number of hours or the intensity of the work. In this paper we propose a framework aimed at managing motivation to improve workplace indicators. The key idea is to allow team managers and workers to negotiate over the conditions of the tasks so as to find the best motivation for the worker within the constraints of what the organization may offer.

Keywords. Fatigue, Workplace, Negotiation

Introduction

Over the past decades, jobs have changed significantly from demanding physical effort to demanding mental effort, with impact at the level of commitment, cognitive performance and mental fatigue [1]. Recent research points out that these effects are not dependent on the time of the task alone [2] but more of a warning sign of our brain pointing that the behavior we are engaged in may no longer be rewarding enough [3].

We are exploring these recent findings to develop a framework aimed at decreasing these effects by focusing on efficient task definition and planning so as to consciously increase the motivation of the worker. Its central element is a negotiation tool that is used to define tasks, their characteristics and the reward system. The key idea is that both the worker and the team manager are allowed to negotiate over these issues so that they are able to find the most suited combination of task/reward, improving the work relationship and, above all, the satisfaction, motivation and commitment of the worker.

1. Definition of the Problem

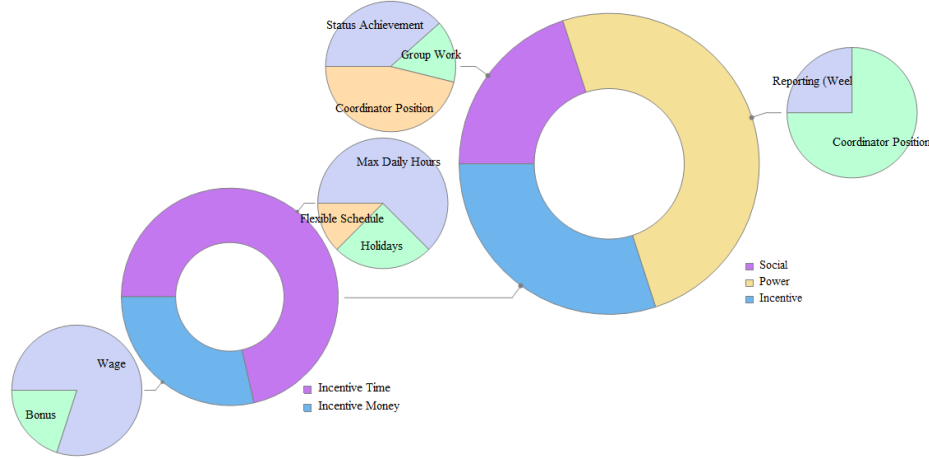
1.1. Motivational Profile

The proposed approach includes an assistant that helps workers in defining their own motivational profile. It provides two important functionalities: (1) selection of motivators

¹Corresponding Author: Davide Carneiro, Universidade do Minho, Departamento de Informática, Campus of Gualtar, 4710 - 057, BRAGA, PORTUGAL. E-mail: dcarneiro@di.uminho.pt.

from a pre-defined and hierarchically organized list and (2) attribution of weights to motivators and its sub-motivators, establishing its relative importance (Figure 1).

Figure 1. Example of a motivational profile in which main motivators selected by the worker (Social, Time, Economic) are sub-divided into more specific ones, with weights of their own.



The following categories of motivators are considered: Incentive (e.g. wage, bonuses, promotions), Fear (e.g. punishment, disciplinary actions), Achievement (e.g. social recognition, positive feedback), Growth (e.g. training courses, workshops), Power (e.g. autonomy) and Social (e.g. inclusion in group, social activities).

Formally, the definition of the motivational profile results in a set $M = D \cup A$. $D = \{D_1, D_2, D_3, \dots, D_n\}$ includes the issues that are seen as negotiable (e.g. salary). $A = \{A_1, A_2, A_3, \dots, A_m\}$ includes abstract issues that cannot be negotiated over or concretely offered by the other part in a negotiation such as social recognition.

Each issue $i \in M$ belongs also to a single category in the set C which contains the six categories of motivators listed before, i.e., $i \in C_k \implies \neg i \in C_l, k \neq l, 1 \leq k, l \leq 6$. The weights that the worker assigned to each issue in a category are denoted $W = \{W_1, W_2, W_3, \dots, W_{m+n}\}$, the weights assigned to each category are denoted $WC = \{WC_1, WC_2, WC_3, \dots, WC_n\}, n \leq 6$. The sum of the weights of each group of motivators belonging to the same category equals 1, i.e., $\sum x = 1 \forall x \in C_i, 1 \leq i \leq 6$. Likewise, the sum of the weights of the categories also equals 1, i.e., $\sum WC_i = 1, i \leq 6$.

1.2. Manager Constraints

The manager must perform a similar exercise to the one of the worker, attributing points to each of the disputable issues. This results in the definition of another set $D = \{D_1, D_2, D_3, \dots, D_n\}$. The manager must also define Management Constraints, which describe what and how much the management is willing to offer for the successful carrying out of a given task.

Constraints may be defined in a variety of ways and may be of two main types: Voluntary Constraints (also called management options) or Legal Constraints (also called legal impositions). While the first kind may vary and are an option of the management,

the second are defined by law and are therefore rigid. As an example, Law usually sets up a minimum of holidays and a minimum of wage; and these are mandatory rules.

The simplest examples consist in the definition of limits, such as in the setting of a maximum/minimum limit for the salary or for the number of holidays. There are more complex cases in which a relationship exists between the variables that affects their values, as when the manager is not willing to offer simultaneously the maximum amount of two given issues. Several alternatives are considered in this scenario. The management can select from a set of predetermined available relationships (e.g. the value of the variable *holidays* depends inversely on the value of the variable *wage*). Another approach is also available, for the cases in which the management is not able to select from one of the pre-defined functions or none of them are suitable. This being the case, the relationship is set by selecting some of its points. Let us assume a scenario in which the duration of the workday depends on the salary and on the holidays in the following way: if the value of the variables *Salary* and *Holidays* decreases, the value of the variable *Workday* decreases as well, i.e., the worker is allowed to work less hours per day as long as he gives up on some of the holidays and some of his wage, and vice-versa.

Under this approach, the manager would ask himself which combinations of values would be acceptable. For example, it would be acceptable for a worker to have a workday of 5 hours, so long he earned 500 euros and enjoyed only three days of holidays. Otherwise, if the worker wanted to earn 750 euros, he would have to work 8 hours a day and enjoy only 2 days of holidays. The manager should thus define a set of points of the type $\{Salary, Holidays, Workday\}$, such as $P = \{\{500, 7, 8\}, \{500, 5, 7\}, \{500, 3, 5\}, \{600, 6, 8\}, \{750, 2, 8\}, \{650, 3, 8\}\}$.

Provided with such a set, the framework will find a least-squares fit to its list of points as a linear combination. This fit would result in an area such as the one defined in Figure 2. At this point, the manager could change any of the parameters (i.e. boundaries and relationship) to better fine-tune his constraints.

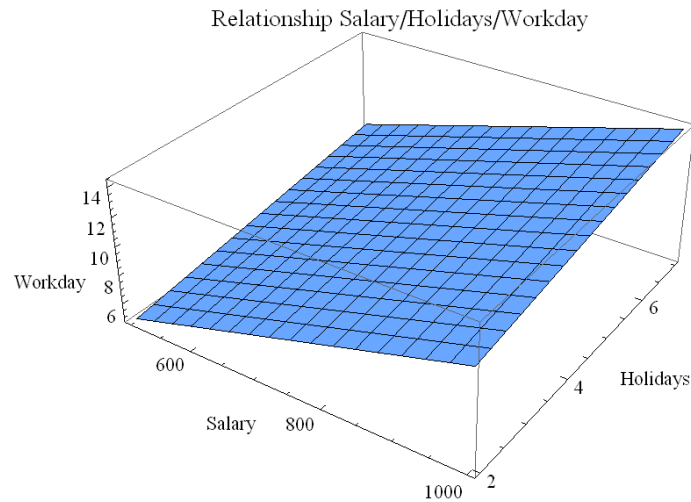
This approach could still be used for problems with a larger number of variables, despite the graphical visualization of the resulting area in more than three dimensions not being available. It thus results in an intuitive and relatively simple approach to model the problem from the manager's point of view.

2. Negotiating over Task/Rewards to Increase Worker Motivation

The underlying principle of this work is that both the worker and the team manager negotiate to find the most suited combination of tasks/rewards to improve their employment relationship and, above all, the satisfaction, motivation and commitment of the worker. Walton and McKersie [4] propose that negotiation processes can be classified as distributive or integrative. Although the authors did not suggest one type of negotiation being superior to the other, Kersten notes that over the years, it has become conventional wisdom that the integrative type allows for better compromises [5].

Traditional negotiation decision support has focused upon providing users with decision support on how they might best obtain their goals. Such advice is often based on Nash's principles of optimal negotiation or bargaining [6]. Game theory, as opposed to behavioural and descriptive studies, provides formal and normative approaches to model bargaining. One of the distinctive key features of game theory is the consideration of

Figure 2. Graphical visualization of the area that results from the least-squares fit to the set of points P , represented by the function $dailyWork(S, H) = -2.83739 + 0.0130602S + 0.588988H$



zero-sum and non-zero-sum games. These concepts were adopted to distinguish between distributive and integrative processes.

Limitations of game theory in providing prescriptive advice sought by disputants and their advisers on one hand, and the developments in multi-criteria decision-making and interactive methods on the other, provided the groundwork for negotiation analysis as discussed in [7]. Much negotiation outside the legal domain focuses upon interest-based negotiation. Expanding on the notion of integrative or interest-based negotiation, Fisher and Ury developed the notion of principled negotiation [8]. Principled negotiation promotes deciding issues on their merits rather than through a haggling process focused on what each side says it will and will not do.

In the domain of legal negotiation, Mnookin and Kornhauser introduced the notion of bargaining in the shadow of the trial (or law) [9]. By examining the case of divorce law, they contended that the legal rights of each party could be understood as bargaining chips that can affect settlement outcomes.

Walton and McKersie's work and the game theory research of John Nash led to a significant use of game theory to support negotiation in industrial relations. Game theory is particularly applicable in countries where employers and employees can bargain with very few restrictions.

Consider for example, the Australian Workplace Relations Amendment (Work Choices) Bill 2005. The bill encourages employers and employees to conduct direct negotiations about employment conditions. While the legislation creates a Fair Pay Commission to ensure that all agreements meet five basic principles, the legislation encourages interest-based negotiation rather than arbitrated or judicial decisions.

These basic principles can be considered as constraints (or rules) which are non-violatable. Such non-violatable constraints might be enshrined in legislation and might include the right to four weeks paid annual leave and the right to up to ten days paid sick leave each annum. The legislation may stipulate that annual leave cannot be accrued, whereas sick leave can be accrued.

An interesting issue might be whether annual leave can be paid out i.e., a worker might decide to not take her full entitlement to annual leave and rather work an extra period of time and so be paid for this work. Unions might argue that it is important, to prevent fatigue, for employees to take their full allotment of work annually, otherwise they might become fatigued and increase their chances of injury. If workers are allowed to work during their annual leave, then annual leave becomes a violatable constraint – a constraint that holds in principle, but can be violated in practice.

Sick pay, on the other hand, needs to be a non-violatable constraint. Employees should not be encouraged to receive cash in lieu of taking sick leave. Thus non-violatable constraints need to be enshrined in legislation or the outcomes of landmark cases. Violatable constraints are principles developed by the employer or employee. They might under certain conditions be abandoned and are the focus of integrative negotiation. In the following example, we indicate some violatable and non-violatable constraints, and how our Asset Divider system deals with these constraints [10].

Suppose the Sports Ace runs a series of three stores selling athletic goods. Their shops are open seven days a week: 9am-6pm Mondays to Thursdays, 9am-9pm on Fridays, 9am-5pm on Saturdays and noon-5pm on Sundays. Employees should receive one hour for lunch time, work forty hours a week, and receive twenty days annual leave and ten days sick leave per annum. If an employee works more than forty hours per week, they receive a bonus of 50% for each extra hour. Whilst holiday leave can be cashed out (thus a violatable constraint), sick leave cannot (a non-violatable constraint). Thus the parties cannot bargain over sick leave being paid out.

Because employees wish to be paid over-time, they wish to work more than forty-hours per week and during their vacation time. They also prefer working in the week, rather than at weekends. The employer wants employees to work 7 hours a day, six days a week and take 20 days holidays per annum. Worker also wants to earn between € 800 - € 1000 and € 600 bonus per week.

Issue	Sub-issue	Employee Ratings	Employer Ratings
Working Hours		30	20
	Daily	80	60
	Weekends	20	0
	Holidays	0	40
Money		50	70
	Wage	30	75
	Bonus	70	25
Pension		20	10

Table 1. Example of the preferences provided by the parties in this example scenario

Employers have to pay money into a pension fund for employees. There is a legislative requirement that the employer must pay 9% of the salary into this fund (a non-violatable constraint). However the employees would like the employer to pay 12%. He is also willing to pay € 700 to € 850 and up to € 400 in bonus week.

Table 1 depicts the preferences provided by the parties when asked to do so. There are three main issues pointed out by the parties: *Working Hours*, *Money* and *Pension*. *Working hours* subdivides in *Daily*, *Weekends* and *Holidays* while *Money* subdivides in *Wage* and *Bonus*.

Asset Divider works thus: the largest difference is on Money (20 points). So it is considered first. Thus the employer pays € 850 per week and a € 600 bonus. This gives the employer 52.5 points and the employee 35 points. Then we consider working hours: Employees will work 8 hours a day and up to 45 hours per week, but will not be able to work more than 48 weeks per year. This gives the employer 60.5 (52.5 + 8) points and the employee 68 (35 + 33) points. To get an even split we give employer 90% on pension (so he finishes with 69.5 points and employee 70 points) – this would mean a pension of 9.3% per annum.

3. Conclusions

In this paper we looked at the relevance of worker motivation on workplace indicators. The main aim was to look at how negotiating task characteristics and reward system can improve motivation. We described an approach for parties to negotiate over such issues. The main objective is that employees can find the working conditions (in terms of time management, money, etc.) that motivates them the most while employers can provide such conditions in an optimal way, given their objectives and restrictions. We are now taking steps towards the full implementation of this approach in a real workplace context to assess its validity and usefulness.

Acknowledgements

This work is part-funded by ERDF - European Regional Development Fund through the COMPETE Programme (operational programme for competitiveness) and by National Funds through the FCT - Fundação para a Ciência e a Tecnologia (Portuguese Foundation for Science and Technology) within projects FCOMP-01-0124-FEDER-028980 (PTDC/EEI-SII/1386/2012) and PEst- OE/EEI/UI0752/2014.

References

- [1] G.R.J. Hockey, Compensatory control in the regulation of human performance under stress and high workload: a cognitive-energetical framework. *Biol. Psychol.* 45, 73–93, 1997.
- [2] K. Sparks, C. Cooper, Y. Fried, A. Shirom, The effects of hours of work on health: a meta-analytic review. *J. Occup. Organ. Psychol.* 70, 391–408, 1997.
- [3] J. Siegrist, Adverse health effects of high effort/low reward conditions. *J. Occup. Health Psychol.* 1, 27–41, 1996.
- [4] R. E. Walton, R. B. McKersie, *A behavioral theory of labor relations*. New York, 1965.
- [5] G.E. Kersten, Modeling Distributive and Integrative Negotiations. Review and Revised Characterization. *Group Decision and Negotiation.* 10(6), 493-514, 2001.
- [6] J. Nash, Two Person Cooperative Games, 21 *Econometrica* 128-140, 1953.
- [7] H. Raiffa, *The Art and Science of Negotiation: How to Resolve Conflicts and Get the Best Out of Bargaining*, Cambridge, Massachusetts: The Belknap Press. 1982.
- [8] R. Fisher, W. Ury, *Getting to YES: Negotiating Agreement Without Giving In*, Boston: Houghton Mifflin, 1981.
- [9] R. Mnookin, L. Kornhauser, Bargaining in the shadow of the law: The case of divorce, *Yale Law Journal*, 88: 950-997, 1979.
- [10] J. Zeleznikow, Comparing the Israel – Palestinian dispute to Australian Family Mediation. *Group Decision and Negotiation Journal*. Published online 28 September 2011.