

THE EFFECT OF EMPLOYEE INTELLIGENCE ON  
JOB MODIFICATION: A LONGITUDINAL  
EXPLORATORY ANALYSIS

by

Y. Fried\*  
Y. Ganzach\*\*

Working Paper No 7/2015

November 2015

**Research no.: 01650100**

\* Management Department , Whitman School of Management, Syracuse University,  
New York, USA. E-mail: [yitzhak.fried@ttu.edu](mailto:yitzhak.fried@ttu.edu)

\*\* Recanati Graduate School of Business Administration, Tel Aviv University, Ramat  
Aviv, Tel Aviv, 69978, Israel. Email: [yoavgn@post.tau.ac.il](mailto:yoavgn@post.tau.ac.il)

This paper was partially financed by the Henry Crown Institute of Business Research in  
Israel.

The Institute's working papers are intended for preliminary circulation of tentative  
research results. Comments are welcome and should be addressed directly to the authors.

The opinions and conclusions of the authors of this study do not necessarily state or  
reflect those of The Faculty of Management, Tel Aviv University, or the Henry Crown  
Institute of Business Research in Israel.

## Abstract

The study examined in a large and diverse sample the effect of individual intelligence on changes in reported job characteristics over a three year time period. The results supported our hypothesis, indicating that intelligence is positively related to modification of job characteristics over time, such as that the higher the job incumbent's intelligence, the greater the degree of job modification toward increased job complexity. The contribution and implications of the results are discussed.

Work design researchers have traditionally assumed that employees' jobs are designed by management (e.g., Grant & Parker, 2009; Grant, Fried, & Julliete, in press; Hackam & Oldham, 1980). Increasingly, however, scholars have begun to challenge this assertion, suggesting instead that in today's dynamic and rapidly changing work environment employees are playing a greater role in modifying (crafting) the characteristics of their own jobs (e.g., Black & Ashford, 1995; Clegg & Spencer, 2007; Dawis & Lofquist, 1984; Fried, Hollenbeck, Slowik, Tieg, & Ben-David, 1999; Grant & Parker, 2009; Grant, Fried, Parker, & Frese, 2010; Ilgen & Hollenbeck, 1999; Nickolson, 1984; Rousseau, Ho, & Greenberg, 2006; Wrzesniewski & Dutton, 2001).

However, interestingly, despite the growing theoretical interest in the role of employees in modifying their job characteristics, very little empirical research has been conducted to shed light on this phenomenon and on the factors that contribute to it (Grant & Parker, 2009). In the current study we attempt to advance our knowledge in this area by examining how individual differences in intelligence (general mental ability) are likely to affect the extent and type of modifications (changes) that individuals make in their job characteristics over time. In our study we focus on individuals who remained in the same job and organization over a three year period. Our purpose was to explore the relationship between these individuals' level of intelligence and the modifications that occurred in the characteristics of these individuals' jobs during this time period.

#### *Modifying job characteristics over time*

Job modification refers to actions employees pursue in order to reshape or modify the characteristics of their jobs (e.g., Clegg and Spencer, 2007; Grant & Parker, 2009;

Wrzesniewski & Dutton, 2001). In other words, job modification involves the process of crafting the existing characteristics of one's job (cf. Wrzesniewski & Dutton, 2000).

Clegg and Spencer (2007) argued that when employees perform well on the job, this provides them with favorable evidence about their competence. This, in turn, increases their trust in themselves and consequently motivates them to craft their jobs by expanding their roles toward greater levels of responsibility, complexity, and challenge. The ability of these employees to expand their roles is consistent with the fact that given their high performance, their supervisors have a higher degree of trust in them and thus enable and encourage them to expand their roles (see also, Fried et al., 1999; Ilgen & Hollenbeck, 1991). The modification of employees' jobs towards higher complexity involves the enhancement of several key job characteristics, including skill variety, task identity, task significance, autonomy, feedback, and social interactions (see, e.g., Hackman & Oldham, 1980; Hackman & Oldham, 1975, Sims, Szilagyi, & Keller, 1976). For example, employees may negotiate with their supervisors to increase their decision making latitude (autonomy) on issues related to their work (Fried et al., 1999), their responsibility for the completion in all aspects of the job from beginning to end (high task identity), and their involvement in a wider range of projects. This would likely result in higher task and skill variety at work, and potentially higher engagement (dealing with other employees in related (interdependent) jobs. The increase in job complexity is also likely to result in higher task significance, associated with greater effects on the lives of others inside and outside the organization (Fried & Ferris, 1987; Hackam & Oldham, 1980; Grant & Parker, 2009). In addition, the expansion of job responsibility and increased engagement with other employees may further enhance these individuals'

opportunities for friendship, which is increasingly recognized as an important contributor to employee motivation at work (Hackman & Lawler, 1971, Sims et al., 1976; Grant & Parker, 2009). Finally, the expansion in job responsibilities, scope of tasks and skills used, and the increase in engagement with other employees in interdependent jobs are also likely to be associated with increased feedback from the job itself and others (supervisors and peers) (Hackman & Oldham, 1980).

In a similar vein, when employees perform poorly, their trust and their supervisors' trust in their ability to perform declines. As a result, these employees will be less motivated and will be given less opportunity by their supervisors to engage in opportunities to expand their roles in the workplace. Rather, they may be encouraged by management to constrict their jobs by crafting simpler, less challenging roles associated with lower levels of key job characteristics of task variety, task identity, task significance, autonomy, and feedback (Clegg & Spencer, 2007; Grant & Parker, 2009).

#### *Intelligence and modification of job characteristics*

There is a paucity of research on variables predicting the extent and type of job modification that individuals engage in. In this study we test the effect of intelligence, a potentially powerful predictor of employee engagement in job modification (e.g., Grant & Parker, 2009; Ganzach, 2008).

The literature suggests that people tend to gravitate to jobs that fit their level of intelligence: individuals with higher levels of intelligence tend to be involved in complex jobs, while individuals with lower levels of intelligence are likely to be engaged in simpler jobs (e.g., Wilk, Desmarais, & Sackett, 1995; Ganzack, 1998). The literature

further indicates that intelligence is positively related to individuals' desire to be engaged in job complexity, such that more intelligent people have a higher desire to be part of a complex work environment that is consistent with their intellectual characteristics (Ganzach, 1998; Gottfredson, 1986).

Similarly, intelligence may also be positively related to individuals' desire and ability to modify their jobs. Specifically, we suggest that highly intelligent individuals will have a higher desire to modify their jobs toward greater complexity. Because many occupations lack complexity, or over time come to be perceived as low in complexity by intelligent job-holders as they gain experience and skill, intelligence was found to be negatively related to job satisfaction when job characteristics were held constant (Ganzach, 1998). This suggests that highly intelligent individuals are more likely to have a higher desire to expand their job characteristics toward higher complexity and challenge, relative to their less intelligent counterparts (cf. Ganzach, 1998; Grant & Parker, 2009). Moreover, because of their higher cognitive ability and skills, people with a high degree of intelligence are likely to have a greater capacity to successfully pursue job expansion (Grant & Parker, 2005; Morgeson et al., 2005). Therefore:

*Hypothesis:* Intelligence will be positively related to modification of job characteristics over time, such that the higher the job incumbent's intelligence, the greater the degree of job modification toward increased job complexity.

## Method

### *Data*

The data were taken from the National Longitudinal Survey of Youth (NLSY), a probability sample of 12,686 American males and females born between 1957 and 1964 (with an oversampling of African Americans, Hispanics, and economically disadvantaged Whites). The surveys were administered annually starting at 1979 (and bi-annually from 1996). However, because information about job characteristics was collected only in 1979 and 1982, we conducted our analyses on the data in these two time periods.

In the analysis we included only participants who stayed in the same job between 1979 and 1982. To identify these participants we used two criteria: (1) they had to stay in the same (census) occupation in those three years; and (2) they had to stay with the same employer during these years. These resulted in 219 participants who met these criteria.

### *Measures*

*Intelligence:* The measure of intelligence is derived from participants' test scores on the Armed Forces Qualifying Test (AFQT). This test was administered to groups of 5 to 10 members of the NLSY during the period June through October 1980; respondents were compensated, and the overall completion rate was 94%. The intelligence score is the sum of the standardized scores of four tests: arithmetic reasoning, paragraph comprehension, word knowledge, and mathematics knowledge.

*Job complexity:* Job complexity was assessed using a six-item questionnaire in which each item represents one factor of the Job Diagnostic Survey (Sims, Szilagyi, & Keller, 1979). Participants were asked to evaluate their jobs with regard to the degree to

which they are involved in dealing with others, autonomy, feedback, opportunities to complete tasks, task identity and task variety. We averaged the ratings on these items to construct an overall index of job complexity.

*Control variables:* Age, sex, tenure and job satisfaction were used as control variables. Job satisfaction was used as a control to safeguard against the possibility that the rating of job complexity is influenced by job attitudes (e.g., Fried & Ferris, 1987). It was measured on a one item scale ranging from 4 (like my job very much) to 1 (dislike my job very much).

## Results

Table 1 presents the means, standard deviations, and inter-correlations of our study variables. Model 1 in Table 2 presents the standardized regression coefficients from regressing job complexity in 1982 on job complexity in 1979, intelligence and the control variables. Consistent with our hypothesis, the positive effect of intelligence in this regression ( $\beta = 0.15$ ,  $p < 0.05$ ) suggests a positive relationship between intelligence and increase in job complexity. Model 2 in Table 1 includes job satisfaction at 1979 and 1982 as additional controls, to safeguard against the possibility that worker's assessment of their job characteristics are affected by their job satisfaction. The results of this model indicate that these additional controls had a very little influence on the effect of intelligence on changes in job complexity.

## Discussion

There has been a growing interest in the literature on the phenomenon of job crafting (e.g., Grant & Parker, 2009). However, there is a paucity of research on the determinants



of job crafting. This study attempts to close this gap by examining the relationship between individual intelligence and changes in job characteristics. The results supported the basic idea of the study that more intelligent people are more likely to report an increase in their job complexity over time. The study suggests that management may benefit from knowledge of their employees' intelligence in determining when to encourage and facilitate opportunities for job crafting.

Warzesniewski & Dutton (2001) have suggested multiple motivators for job crafting: need for personal control, desire to sustain positive sense of self and need for human connections. It may be that highly intelligent individuals tend to be high on some of these motivators. For example, managing complex jobs require high sense of control over one's work environment. Therefore, the aspiration of high intelligence individuals to manage complex jobs is likely to be associated with high need for personal control. These individuals tend to also be sensitive to and unhappy in a situation in which they cannot reach their potential and thus sustain a positive sense of self (Ganzach, 1998). In short, it may be that intelligence is a parsimonious measure for multiple motivations for job crafting. Future research would benefit from replicating the results of this study and from comparing the effect of intelligence on job crafting to the effect of the motivators suggested by Warzesniewski & Dutton (2001), on this outcome.

The study has a few limitations. First it focused on a population of young employees, which limits its generalizability. There is therefore a need to extend the study to other populations. Second, data on job complexity is based on a self-report measure which may be susceptible to perceptual biases. However, there is evidence that supports the validity of self-report data of job characteristics (e.g., Farh & Scott, 1983; Gerhart,

1988, Ganzach & Pazi, 2001). Moreover, the results did not change even after we controlled for job satisfaction (at both 1979 and 1982) which the literature has suggested may affect perceptions of job characteristics. In addition, there is no rationale to suggest that individuals with different levels of intelligence differ in how they perceive job characteristics. In fact, we argue that it is likely that higher self-report of job complexity by employees with higher intelligence will reflect actual change (increase) in job complexity. This is because of the tendencies of intelligent people to become accustomed to and bored with their jobs, and their aspiration to enhance their job complexity and challenge. If they are unable to enhance their job complexity these intelligent individuals are likely to report the same level or even a reduction in job complexity because of their tendency to get bored and uninspired with their job, if job requirements remain the same. We therefore interpret the positive association we found between intelligence and reported changes in job complexity over the three year time period as supportive of our hypothesis that individuals with higher intelligence are more likely to modify (craft) their jobs towards higher complexity. A final limitation of our study is that our data did not enable us to examine the underlying processes that lead to job modifications over time. Future research would benefit from examining these processes.

## References

- Black, J. S., & Ashford, S. J. (1995). Fitting in or making jobs fit: Factors affecting mode of adjustment for new hires. *Human Relations, 48*: 421-437.
- Clegg, C., & Spencer, C. (2007). A circular and dynamic model of the process of job design. *Journal of Occupational and Organizational Psychology, 80*: 321-339.
- Dawis, R. V., & Lofquist, L. H. (1984). *A psychological theory of work adjustment*. Minneapolis: University of Minnesota Press.
- Farh, J., & Scott, W.E. (1983). The experimental effects of autonomy on performance and self reports of satisfaction. *Organizational Behavior and Human Performance, 31*, 203-222.
- Fried, Y., Hollenbeck, J. R., Slowik, L. H., Tiegs, R. B., & Ben-David, H. A. (1999). Changes in job decision latitude: The influence of personality and interpersonal satisfaction. *Journal of Vocational Behavior, 54*: 233-243.
- Ganzach, Y. (1998). Intelligence and job satisfaction. *Academy of Management Journal, 41*, 526-539.
- Grant, A. M., Fried, Y., & Juillerat, T. (in press). Work matters: Job design in classic and contemporary perspectives. Forthcoming in S. Zedeck (Ed.), *APA handbook of industrial and organizational psychology*. Washington, DC: American Psychological Association.
- Grant, A. M., & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *Academy of Management Annals, 3*: 317-375.

- Grant, A.M., Fried, Y., Parker, S.K., & Frese, M. (2010). Putting job design in context: Introduction to the special issue. *Journal of Organizational Behavior*, 31, 145-157.
- Ganzach, Y., & Pazi, A. (2001). Within-occupation sources of variance in incumbent perception of job complexity. *Journal of Occupational and Organizational Psychology*, 74, 95-108.
- Gerhart, B. (1988). Sources of variance in incumbent perception of job complexity. *Journal of Applied Psychology*, 73, 154-162.
- Gottfredson, L.S. (1986). Societal consequences of the g factor in employment. *Journal of Vocational Behavior*, 29, 329-340. Hackman, J. R., & Lawler, E. E. 1971. Employee reactions to job characteristics. *Journal of Applied Psychology*, 55: 259-286.
- Hackman, J.R. & Oldham, G.R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology*, 60, 159-170.
- Hackman, J.R. & Oldham, G.R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Ilgen, D., & Hollenbeck, J. 1991. The structure of work: Job design and roles. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology, volume 2*: 165-208. Palo Alto: Consulting Psychologists Press.
- Morgeson, F. P., Delaney-Klinger, K., & Hemingway, M. A. (2005). The importance of job autonomy, cognitive ability, and job-related skill for predicting role breadth and job performance. *Journal of Applied Psychology*, 90: 399-406.
- Nicholson, N. (1984). A theory of work role transitions. *Administrative Science Quarterly*, 29: 172-191.

- Rousseau, D. M., Ho, V. T., & Greenberg, J. (2006). I-deals: Idiosyncratic terms in employment relationships. *Academy of Management Review*, 31: 977-994.
- Sims, H., Szilagyi A., & Keller, R. (1979). The measurement of job characteristics. *Academy of Management Journal*, 19, 195-212.
- Wilk, S.L., Desmarais, L.B., & Sackett, P.R. (1995). Gravitation to jobs commensurate with ability: Longitudinal and cross-sectional tests. *Journal of Applied Psychology*, 80, 79-85.
- Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, 26: 179-201.

Table 1

*Descriptive statistics and inter-correlations*

	M	SD	1	2	3	4	5	6	7
1. Intelligence	40.6	28.4	--						
2. Job characteristics 1979	3.48	0.82	0.35	--					
3. Job characteristics 1982	3.38	0.83	0.28	0.46	--				
4. Age	23.5	1.73	0.02	0.11	-0.01	--			
5. Sex (1=male)	1.51	0.50	0.09	0.01	-0.05	0.03	--		
6. Tenure 1982 (weeks)	206.6	47.3	0.02	0.02	0.08	0.10	-0.19	--	
7. Job satisfaction 1979	3.30	0.78	0.15	0.40	0.28	0.08	-0.03	-0.02	--
8. Job satisfaction 1982	3.22	0.76	0.01	0.21	0.32	0.06	-0.02	0.09	0.45

Correlations above 0.12 are significant at the 0.05 level.

Table 2

*Regression results predicting job characteristics in 1982*

	Model 1		Model 2		Model 3	
	<b>b</b>	<b>t</b>	<b>b</b>	<b>t</b>	<b>b</b>	<b>t</b>
Intelligence (IQ)	0.15*	2.3	0.16*	2.4	0.15*	2.3
Complexity at 1979	0.39*	6.2	0.34*	5.0	0.38*	6.2
Age	-0.03	0.3	-0.05	0.3	0.02	0.1
Sex	-0.02	0.6	-0.02	0.7	-0.03	0.5
Tenure	0.08	0.2	0.06	0.4	0.11	1.3
Satisfaction 1979			0.02	0.8		
Satisfaction 1982			0.22*	3.1		
Supervisor competence (SC)					0.14*	2.4
SC x IQ					0.15*	2.4
R <sup>2</sup>		0.22		0.25		0.27

\* p&lt;0.05, n=215