

An Investigation of Objective Person-Environment Fit: The Dark Side of Intelligence

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Abstract

Most previous studies of Person-Environment fit have failed to use objective measures of the work environment that are independent of the person examined. The current research investigated the moderating role of group size (an objective measure obtained from company records), on the relationship between intelligence and pay satisfaction. The intelligence was measured as general intelligence or “g” and “reasoning”. On the basis of data from 257 shop-floor workers in a factory, results indicated that group size moderated the relationship between intelligence and satisfaction with pay - the relationship was negative in large groups and positive in small groups.

Keywords: Person-Environment fit, Objective, Intelligence, Group size, Pay satisfaction

1. Introduction

Parsons' (1909) seminal work appears to be the first to have stressed the importance of both person and environment variables in vocational choice. There is an abundance of research that examined the degree of fit between the person and the environment (i.e., person-environment fit or P-E fit) and how that is associated with satisfaction. Kristof, Zimmerman and Johnson (2005) have given one of the most up-to-date and comprehensive review of the previous studies on P-E fit. So have Piasentin and Chapman (2006) and Verquer, Beehr and Wagner (2003) when they conducted a meta-analytic review of 46 and 21 studies of P-E fit respectively. Yet, despite the illuminating articles by Kristof et al., (2005, 1996), other researchers (Wessel, Ryan and Oswald, 2008) appeared somewhat confused especially when it came to operationalising objective fit. True objective fit, is the fit when the measures of the environment are taken from a separate source and not from the respondent who is providing the information relating to the ‘person’ variable (Kristof et al., 2005, 1996). One example of a measure of the environment that can be obtained from company records is group size. Until today, there has not been a single P-E fit study that addressed this issue specifically. Moreover, most P-E fit research looked at personality or values when measuring the person. Intelligence, as a measure of the person, has previously been ignored in P-E fit literature.

2. Objective

The objective of this study is to examine the degree of fit between the person and the environment and how that is associated with satisfaction. More precisely, it examines the interaction between intelligence (person) and group size (environment) and how that is associated with pay satisfaction (dependent variable). For instance, *does the relationship between intelligence and pay satisfaction vary with group sizes?* This is the main research question that this study aims to answer. Whereas most research only treats the variable of group size as a direct determinant of satisfaction of its members, this research treats group size as a possible moderator. For instance, Ganzach (1998) has suggested that, for simple and mundane jobs, intelligence has a negative relationship with satisfaction. This research however aims to investigate whether, in simple jobs, the relationship between intelligence and satisfaction can be moderated by group size.

3. Literature Review

3.1 Person-Environment fit or P-E fit

P-E fit was summarized by Edwards (1996: 292) as follows: “In essence, P-E fit embodies the premise that attitudes, behaviour and other individual level outcomes result not from the person or environment separately, but rather from the relationship between the two (Lewin, 1951; Murray, 1938; Pervin, 1989).” Kristof (2005, 1996), Piasentin and Chapman (2006) and Verquer, Beehr and Wagner (2003) have done a thorough literature review and as such, the bulk of it will not be reproduced here. Rather, what is discussed in this paper are the two

main ways of conceptualizing fit – direct and indirect. This eventually leads to the researcher's justification and recommendation that the environment should be measured objectively (in order to get a correspondingly objective measure of fit).

Kristof et al., (2005, 1996) indicated that some researchers have used *direct* measures of fit (i.e., by asking people explicitly whether they believed a good fit exists). Posner, Kouzes and Schmidt (1985) used such a method. In their study, managers directly rated how compatible their values were with those of their organizations and how often they had to compromise personal principles to meet organizational expectations. This method is plagued by the consistency bias (i.e., "I think that I fit well, so I must be satisfied with my job") and is therefore not adopted in the current research. Due to this drawback, some researchers have relied on *indirect* measures to assess fit. According to Kristof (1996), *indirect* measures are more reliable because the respondent is asked to rate the individual separately from the environment without being asked to assess the degree of fit. This method (hereinafter called "the moderator approach") does not insist on commensurate measures. The person and the environment can be measured separately (as they should be), using entirely different instruments. The nature and ranges of the two scales can be entirely different. This does not require the respondent to assess fit either directly or indirectly. In fact, it makes it virtually impossible for the respondent to even attempt to assess fit. In this respect, the moderator approach is superior in that the consistency bias inherent in the direct measurement of fit approach can be totally eliminated.

However, it can be argued that the biggest advantage with this method is that objective measures of the environment can be used. Objective measures are measures that do not require any conceptual transformation on the part of the respondent. Hence, it is entirely independent of the person (respondent). Unfortunately, many studies that have used the moderator approach have failed to capitalize on this advantage. For example, in Lee, Ashford and Bobko (1990), control was measured perceptually by the respondent. In Barrick and Mount (1993), autonomy was measured perceptually. Edwards (1991) criticized direct measures primarily because they confound the constructs of the person and environment, thereby preventing the estimation of their independent effects. Yet, amazingly, he did just that (in Edwards, 1996) - environmental supplies and personal values (S-V) fit were measured by asking respondents how much of each task was involved in their job and how much of each task they preferred. This procedure was also employed in another research by Livingstone, Nelson and Barr (1997) who also conducted a study that employed a similar measure of S-V fit in their research. Although Edwards (1991) pointed out that there is a real need for future research to use objective measures (of either the person or the environment), he has not done so himself and there appears to be none done by others reported even until today. Thus, there is a pressing need for a research to be conducted that uses a truly objective measure (i.e., one which is obtained from a source other than the respondent).

3.2 Group Size

Group size, a measure that can be obtained from company records, is one aspect of the work environment that can be measured objectively. Social interactions in groups are frequently characterized by conflicts between personal and collective interests (De Cremer and Leonardelli, 2003). Thus, it is not surprising that research has shown that smaller groups establish and maintain higher levels of communication (Lowry, Roberts, Romano, Cheney and Hightower, 2006) whereas larger groups have reported lower satisfaction (Frank and Anderson, 1971; Shaw, 1981; Slater, 1958; Worthy, 1950). As group size increases, almost every group experiences some degradation in group communication process due to social loafing (Chidambaram and Tung, 2005; Liden, Wayne, Jaworski, and Bennett, 2009). Dissatisfaction with large groups is also reflected by greater absenteeism and personnel turnover (Shaw, 1981). However, small groups are not always better than larger groups. Aiken and Wong (2003) discovered that for idea generation, groups may not be effective until they reach a certain size. However, this apparent controversy over which size is better can be summed up by Worthy (1950) who stated that mere size is unquestionably one of the most important factors in determining the satisfaction of employees - and dissatisfaction can have serious consequences for the company.

3.3 Intelligence

One aspect of the person that can be measured is intelligence. Intelligence or intelligent activity has been defined as requiring the grasping of the essentials in a situation and responding appropriately to them (Heim, 1970). Previous studies have suggested that, for simple and mundane jobs, intelligence may have a negative relationship with satisfaction. Early studies have shown that in simple jobs, there is usually a significant negative relationship between intelligence on the one hand and satisfaction and the probability of remaining in such jobs on the other. For example, in a study of one hundred and thirty-three low-level clerical workers, Bills (1923) found that all of the clerks with IQs greater than 110 were so dissatisfied that they left within a thirty-month period. This can be

contrasted to clerks with IQs of less than 80, only 27% of whom left within the same period. Similarly, Starch (1922) found that waitresses with low intelligence test scores were much more likely to remain in their jobs than waitresses with high ones. Similar results were obtained by Viteles (1924), who conducted a study on cashiers and wrappers. Bills (1923) have suggested that, for simple and mundane jobs, intelligence may have a negative relationship with satisfaction. On the other hand, Frank and Anderson (1971), Shaw (1981) and Slater (1958) have suggested that group size has a negative relationship with satisfaction.

However, there appears to be no reported studies that investigated the interacting effects of group size and intelligence on satisfaction. Thus, the research question in this study is, *does the relationship between intelligence and satisfaction, vary with different group sizes?* To put the question in another way, are intelligent workers more satisfied working in small groups where their efforts are easily noticed whereas less intelligent workers are more satisfied working in larger groups where they are less visible? If this is indeed true, then the relationship between intelligence and satisfaction should be positive in small groups, whereas the same relationship should be negative in large groups. This research follows the recommendations of Roberts and Foti (1998) who pointed out that recent research on the determinants of satisfaction has shifted from debating the effectiveness of either the situational models or the dispositional models to a consideration of the person-situation interactional perspective. Therefore, although previous studies involving simple jobs have reported negative relationships between intelligence and satisfaction (Bills, 1923), and between group size and satisfaction, there appears to be no reported study on the moderating effects of group size on the intelligence - satisfaction relationship.

Accordingly, the hypotheses are as follows:

H1: The association between intelligence scores and pay satisfaction scores is moderated by group size.

H2: The association between intelligence scores and pay satisfaction scores is negative for large groups and positive for small groups.

4. Research Methodology

4.1 Sample

Data on two hundred and fifty seven shop-floor workers who worked in groups were collected from a light manufacturing assembly plant in Wales, UK (Note 1). The majority of the sample was females - there were one hundred and eighty females (70%) and seventy seven males (30%). The average age of the sample was thirty five (see Table 1). Test administration took place over a period of three months in the factory. The collection of data on the employees in the sample took place in sessions at which, from three to fifteen employees were present. Subjects were asked to supply their names to identify their work groups. Every attempt was made to reduce the respondents' worries and anxieties about participating in the research and that this research was mainly for academic purposes.

4.2 Measures

Intelligence was measured by three instruments. The reason for using multiple measures of intelligence was to compare their relative effectiveness in detecting moderating effects in P-E fit studies. They were as follows:

- 1) The first instrument was the 16 Personality Factor Test (**16PF** Form C: Cattell, Eber and Tatsuoka, 1992). Eight of the one hundred and five questions measured Factor B or "**reasoning**" ability. Scoring was done in accordance with Cattell et al's (1992) instructions.
- 2) The second instrument was Form A of Scale 2 of the Culture Fair Test (**CFT**: Cattell 1987) which measured g_f or fluid intelligence. The use of the IPAT Culture Fair Intelligence Test has been recommended by Cattell et al., (1992) to supplement the Factor B (reasoning) scores obtained from the 16 PF. The reason is that the CFT provides a more thorough measurement of intelligence than the eight items on the 16PF scale. Scoring was done in accordance with Cattell's (1987) instructions – one point was given for each correct answer on the test. The CFT is still being used fairly recently by other researchers (Rabbit, Lunn, Ibrahim and McInnes, 2009).

Group size was measured by the number of workers in the work team as shown in the company records. Pay satisfaction was measured by a one-item numerical scale adapted from Meir, Hadas and Noyfeld (1997), ranging from 1 to 20 (1 being lowest and 20 being the highest level of satisfaction).

4.3 Procedure for defining small and large groups

The procedure for defining group size was as follows: The entire sample was split into three equal groups according to group size (i.e., small, medium and large). Subsequently, only the large groups were compared with

the small groups, the two being at the extremes. The splitting of the sample into the three groups was for the purpose of comparing the correlations between intelligence and satisfaction in large and small groups. In hierarchical multiple regression analyses (see section 5.2) the natural continuous variable of group size was used in order to maximize the amount of variance possible and minimize the possibility of type one errors.

The basis of dividing the groups as such was to adopt a compromise between two opposing recommendations. Roberts and Foti (1998) and Adkins, Ravlin and Meglino (1996) used median splits to divide their sample into two equal groups and then proceeded to compare one group with another. This method has the advantage of utilizing the entire sample in the analyses. However, the disadvantage with this method is that it will inevitably include those respondents who are at the borderline (i.e., just below or just above the mean of the variable under investigation). As such, it was felt that three groups rather than two should be formed and the analyses restricted to the comparison of the two extreme groups only. For instance, Barrick and Mount (1993) divided their entire sample according to +1, 0 and -1 standard deviation. However, the outcome was that there were rather small sub-samples at both ends of the spectrum ($n=59$ at the +1 standard deviation above the mean and $n=49$ at the -1 standard deviation below the mean) with a high 'wastage' ($n=149$) in the middle of the range. The end result was a compromise and the entire sample was divided into three equal groups. The SPSS commands of "summarize – frequencies – statistics – cut points for 3 equal groups" were used to determine the appropriate maximum values for small groups and minimum values for large groups. The result was that groups comprising between two and seven members were classified as small, between eight and fourteen were considered medium, and between fifteen and twenty were considered large.

5. Results

5.1 Reliability

Reliability scores for the Culture Fair Test and reasoning scales were not computed because according to Cattell (1987) and Cattell et al., (1992), the scores for the individual questions were "meaningless" and only the total score for the entire test should be used. Descriptive statistics are given in Table 1 and correlation coefficients between the main variables are given in Table 2. Intelligence was not significantly negatively correlated with satisfaction scores contrary to Bills (1923). Group size was also not significantly negatively correlated with satisfaction scores contrary to Frank and Anderson (1971), Shaw (1981) and Slater (1958).

Insert Table 1 here

Insert Table 2 here

5.2 Results of Hierarchical Regression

Tests of hierarchical regression were used to determine the significance of the interaction term (intelligence multiplied by the group size) on pay satisfaction. The interaction term was successfully accepted into the regression equation after the individual components have been entered into the equation. The results showed support for **H1** in so far as group size was a significant moderator of the intelligence-satisfaction relationships. Full details of the values of R^2 were set out in Table 3. For instance Table 3, Column 3 showed the R^2 values when only the intelligence variable and the group size were entered into the regression equation. Column 4 of the same table show the R^2 values when the intelligence variable and group size as well as the interaction term were all in the equation. Column 5 of the same table shows the change in R^2 as a result of introducing the interaction term.

Insert Table 3 here

Insert Table 4 here

In relation to **H2**, Table 4 shows the values of β and the correlation coefficients in three scenarios: all cases, large groups only and small groups only. Figure 1 plots out the graphs for large groups, small groups and all cases, for pay satisfaction.

Insert Figure 1 here

5.3 Fulfillment of the objective of this study

The objective of this study was partially fulfilled. **H1** was partially supported in that group size was a significant moderator of the relationship between intelligence and pay satisfaction (see Table 3, column 5). The change in R^2 as a result of introducing the interaction term into the regression equation is 0.019, and 0.023 when intelligence was measured by g, and reasoning respectively.

Thus, **H1** is supported by the results in that group size was a significant moderator of the relationship between

intelligence and pay satisfaction. **H2** predicted that the relationship between intelligence scores and pay satisfaction scores was negative for large groups and positive for small groups. **H2** is also partially supported by the results concerning the direction of the relationship, in so far as the values of β are concerned (see Table 4). However, as far as correlations are concerned, the relationship between intelligence and pay satisfaction was moderated by group size such that the relationship was negative for large groups and positive for small groups, only when intelligence was measured by reasoning (Table 5 and Figure 1). When intelligence was measured by *g*, the correlation between intelligence and pay satisfaction was neither significantly negative in large groups nor significantly positive in small groups. Thus, the prediction as to the direction of the relationship between intelligence and pay satisfaction, for small and large groups was not entirely consistent and dependent on how intelligence was measured. **H1** and **H2** were fully supported when intelligence was measured by reasoning, but not by *g*.

6. Discussion

This research lends support to the theory that it is not just the person or the environment that affects attitudinal outcomes such as satisfaction, but rather the interaction between the two, thus reinforcing Parsons (1909), Edwards (1996), Kristof (2005, 1996) and all the other P-E fit studies mentioned in the literature review. Thus, it is important to match the worker (person) with a suitable environment if managers are desirous of improving satisfaction of their subordinates.

The results of this research show support for **H1** (i.e., the hypothesis that the relationship between intelligence and pay satisfaction is moderated by group size). Intelligent people can be less satisfied with their pay if they are made to work in larger groups. This could be because the more intelligent workers could perceive that the other workers in their group are “not pulling their own weight.” Thus, the larger the group, the more dissatisfied these intelligent workers would be. Alternatively, it could be that intelligent workers are more satisfied working in small groups where their efforts are easily noticed whereas less intelligent workers are more satisfied working in larger groups where they are less visible. Whatever the explanation for the results, the practical implication is that managers should not place the more intelligent workers in large groups where they will be less satisfied. Doing so will increase the dissatisfaction of the worker to a point where he/she may leave the company. Having intelligent workers who leave the company can have serious implications for it. If intelligent workers do not stay long enough in the company, it will be left with only the less intelligent workers from whom to promote. These less intelligent workers may eventually be promoted to supervisors, but they may lack the ability of the more intelligent workers who have left the company.

7. Conclusions

The objective of this study was for the most part achieved in that group size was a significant moderator of the relationship between intelligence and pay satisfaction. Intelligence was measured by the 16PF and the Culture Fair Test. Hypothesis **H1** was supported in so far as group size was a significant moderator of the relationship between intelligence and pay satisfaction. With **H2**, the relationship between intelligence and pay satisfaction was not consistently negative in large groups and positive in small groups. The relationship between intelligence and pay satisfaction was negative in large groups ($r = -0.266$, $p < 0.01$) and positive in small groups ($r = 0.243$, $p < 0.01$) only when intelligence was measured by reasoning scales. It was not the case when intelligence was measured by the CFT, which is a much more complex scale than the reasoning scales. One possible reason for the absence of correlations when CFT was used could be that in P-E fit studies, it was generally found that complex scales yielded in weaker correlations with satisfaction, compared with simpler scales (Tranberg, Slane and Ekeberg, 1993).

From the managerial perspective, results seem to suggest that intelligent people should be made to work in smaller groups where they will be more satisfied with their share of the workload, and not in larger groups where they will be less satisfied. However, to be able to do so, management would have to find out which workers are more intelligent and which are less intelligent. This would necessitate intelligence tests to be conducted on all the workers, a decision which may or may not be popular with the management or the workers. From the person-environment perspective, managers have two choices: change the person or change the environment. Managers could either select only those people who have low intelligence scores, or they could limit the group sizes so as not to exceed ten in number. The second alternative seems more desirable, and this action would probably also reduce the occurrence of social loafing hence resulting in increased satisfaction of the average worker. In addition, management can make individual contributions more visible.

8. Limitations

Since this study is cross sectional (as opposed to longitudinal), a conclusion cannot be drawn about the direction

of causality in these findings. However, it is reasonable to hold that the interaction between intelligence and group size was responsible for changes in satisfaction rather than the reverse as the view taken in this research is that personality traits are relatively stable over long periods of time. Another weakness is that the moderator analyses were conducted in a single company. Results cannot be generalized to other companies. However, the findings of this study can benefit from replication studies conducted in other companies. It is also important to stress here that group size per se may not moderate the relationships found in this study. Rather, it is the inherent differences in characteristics of large and small groups that may be the cause of the moderating effect. For instance, if pay is tied to individual performance and not to group performance, there may be no moderating effect of group size on the intelligence-pay satisfaction relationship. It is important that future replication studies fully replicate all the different characteristics of large and small groups and of the company studied. In defence, it can be argued that these characteristics are by no means unique and are likely to exist in other companies.

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Note

Note 1. The rationale for choosing to study only one organization was that most P-E fit studies examine differences between rather than within jobs and professions despite the fact that there may be very large differences between them. (Furnham, Toop, Lewis and Fisher, 1995). In the said article, one of the three reported studies explored P-E fit among two groups of specialist nurses (pediatrics and intensive therapy) (twenty-six and twenty-nine respectively) and one group of general medical nurses (twenty-five). Another reason why data was collected from only one organization was to reduce the variance due to factors that were not measured but must still be controlled (or at least be subjected to some attempt at control). Examples of such factors are differences in company policies, company size, industry sector and geographical location. Adkins Ravlin and Meglino (1996), in their research (which has some similarities with this research), also confined their study to one organization (one-hundred and ninety-one production workers). Thus, it will actually be counter-productive to collect the data from different organizations in this case. Bouchard (1983: 367) stated “Many field studies involve only one organization or subject. While the one case study is generally sterile scientifically.... it need not be. ... A well chosen single case may seriously threaten a traditionally accepted hypothesis.”

Table 1. Descriptives

	Means	Standard deviation
“g” (CFT)	28.18	6.37
Reasoning (16PF)	3.41	1.60
Pay satisfaction	8.83	3.86
Age	35.57	10.66

N= 257

Table 2. Correlations

	1	2	3	4
1. “g” (CFT)	1	.000	.099	.660
2. Reasoning (16PF)	.460**	1	.373	.671
3. Group Size	.103	-.056	1	.372
4. Pay satisfaction	-.028	-.027	-.056	1

Above diagonal = significance

Below diagonal = Pearson correlation coefficients

* for $p < 0.05$ ** for $p < 0.01$

Table 3. Results Hierarchical Multiple Regression

Person Variables	Satisfaction	Hierarchical Multiple Regression		
		R ² with P,E but excluding interaction term P*E	R ² including interaction term	ΔR^2
“g” (CFT)	H1 Pay	.004	.023	.019
Reasoning (16PF)	H1 Pay	.004	.027	.023

Table 4. Regression values of β : Intelligence with Pay Satisfaction

INTELL	ALL CASES (N = 257)	LARGE GROUPS (N = 89)	SMALL GROUPS (N = 97)
“g” (CFT)	-.0038	-.0535	.0599
Reasoning (16PF)	-.0348	-.3803	.2719

Table 5. Pearson Correlation (1 tailed): Intelligence with pay satisfaction

INTELLIGENCE	ALL CASES (N = 257)	LARGE GROUPS (N = 89)	SMALL GROUPS (N = 97)
“g” (CFT)	-.032	-.147	.139
Reasoning (16PF)	-.047	-.250**	.158*

* for $p < 0.05$ ** for $p < 0.01$

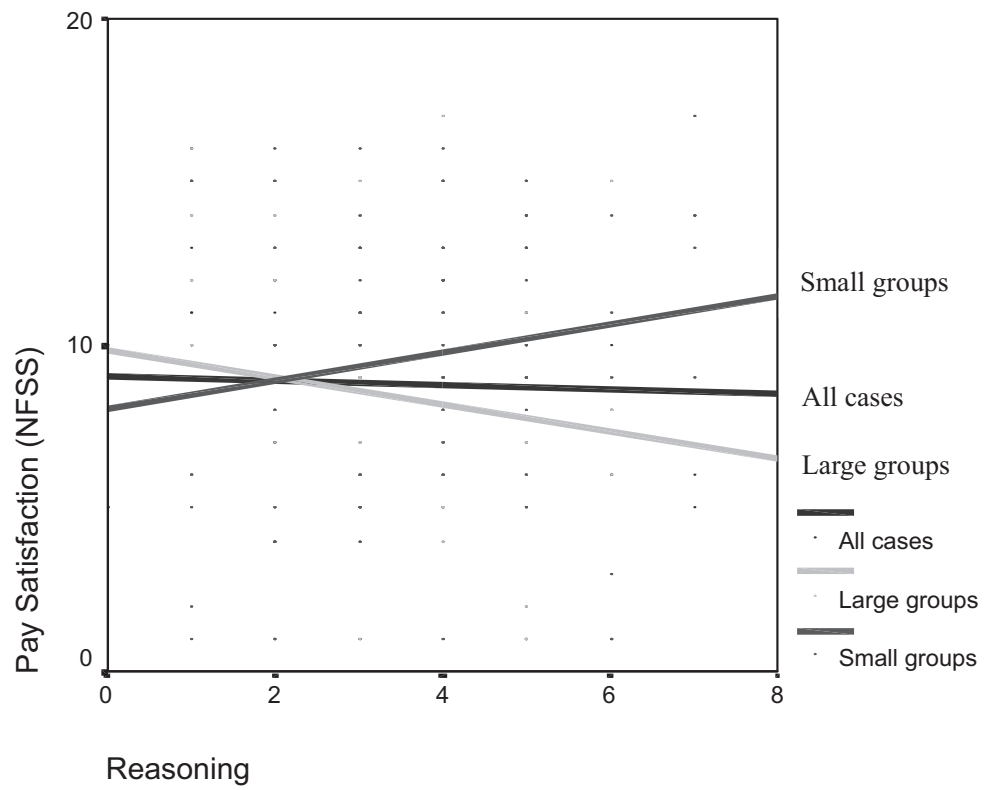


Figure 1. Interactional Effects of Intelligence (Reasoning – 16PF) and Group Size on Pay Satisfaction