# THE RELATIONSHIP BETWEEN INTERPERSONAL AND TASK COHESIVENESS
# AND PERFORMANCE IN A BUSINESS SIMULATION GAME

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## ABSTRACT

The present study examines team cohesiveness as a multidimensional construct composed of perceived interpersonal cohesiveness and perceived task cohesiveness as related to business simulation game performance. The study involved a sample of 316 students divided into ninety-one simulation teams who played The Marketing Management Simulation. It was found that beginning perceived interpersonal and perceived task cohesiveness were not related to ending simulation performance. However, ending perceived task cohesiveness was related to ending game performance but ending interpersonal cohesiveness was not. The findings were taken as support for the multidimensional view of the cohesiveness construct as described in this paper.

## INTRODUCTION

It is generally believed that more cohesive groups will perform better at tasks than less cohesive groups. However, there is considerable debate concerning the appropriate means by which to measure cohesiveness. Mudrack (1989) reviewed forty years of research on organizational psychology concluding that the research on the relationship between task performance and group cohesiveness produced mixed results. The mixed results, according to Mudrack (1989), were due to using far too many measures of the cohesiveness construct. Zaccaro and Lowe (1988) and Zaccaro (1991) also believe that measurement of the construct is an important issue but they believe the mixed results found in the literature is due to the fact that group cohesiveness is really a multidimensional construct composed of task-based cohesion and interpersonal cohesion.

Studies of group cohesion in the business simulation literature have also produced mixed results on the relationship between perceived team cohesion and performance. This study seeks to try to clear up some of this confusion by examining a number of cohesiveness measures, as applied in a business simulation environment, using

Zaccaro's (1 991) conception that team cohesion is a dual construct composed of task and interpersonal cohesion.

Task cohesion is defined as an attraction to the group because of a liking for or a commitment to the group task or resistance to leaving      Interpersonal cohesion reflects an attraction to the group because of satisfactory relationships and friendships with other members of the group" (Zaccaro, 1991 p. 388).

While team cohesion has been reported on in the past, this study takes a slightly different perspective in that it accepts the view that team cohesion is a multidimensional variable construct and then focuses on changes in team cohesion variables over the course of the simulation competition.

## LITERATURE REVIEW

Team Cohesion Construct

Team cohesion, generally viewed as the degree to which team members hold an attraction for each other and a desire to remain intact as a team (Wolfe and Box 1988), has been the focus of a number of studies in the simulation literature. While two early studies (McKenney and Dill 1966 and Deep, Bass and Vaughan 1967) found no relationship between team cohesion and team performance, all more recent studies show such a relationship to exist (Gentry 1980; Gosenpud, Milton and Larson 1985; Hsu 1984; Miesing and Preble 1985; Norris and Niebuhr 1980; Wellington and Faria 1992; and Wolfe and Box 1988). The relationships reported, of course, are positive. That is, high team cohesion is associated with better simulation game performance.

Wellington and Faria's (1992) study is particularly relevant to the research undertaken in this paper because they examined changes in team cohesion over the course of a simulation competition. They concluded that team cohesion was relatively stable and did not change much over time. On the basis of

acceptance and rejection of Hi through H6 fits with the proposition that team cohesion is a multidimensional construct composed of interpersonal and task cohesion with task cohesion being an outcome of performance but not a determinant of performance.

## TABLE 3
## RESULTS OF CORRELATIONS BETWEEN BEGINNING AND ENDING COHESIVENESS RATINGS FOR H5 AND H6

| H5 | N | Correlation | Significance |
|---|---|---|---|
| Wellington's | 242 | .43 | .000** |
| Dobbin's | 243 | .58 | .000** |
| Wheeless' | 244 | .58 | .000** |
| Evan's | 243 | .55 | .000** |
| **H6** | | | |
| Simulation | 243 | .43 | .000** |
| Seashore's | 244 | .49 | .000** |
| Martens' | 241 | .48 | .000** |

** = $p < .05$

An implication from this research for simulation game administrators involves the formation of teams. Since task cohesiveness develops in relation to simulation performance, measuring task cohesiveness a priori and assigning teams to industries on this basis should not enhance performance. Similarly, the p priori matching of teams based on interpersonal cohesiveness should not be a critical concern. This is not to suggest, however, that simulation game administrators need not care about team cohesiveness. After all, group experiences, which involve cohesive teams, are bound to be more satisfying than experiences where teams are not cohesive.

The results from this study suggest why past cohesiveness research has shown mixed results as related to performance or productivity. While, as Mudrack (1989) suggests, measurement problems may well underlay many of the inconsistencies, this study provides support for the notion that it may be a conceptual problem as noted by Zaccaro and Lowe (1988). In light of the findings from this study, future investigations should consider the use of multiple cohesiveness measures reflecting a multidimensional cohesiveness construct composed of interpersonal cohesiveness and task cohesiveness.

This study has several important limitations. Firstly, it involves students formed into teams by self-selection in a large introductory marketing class. Many of the students may have been experiencing their first university level group project and almost all were undertaking their first business simulation game. Further, instructor interaction with and input into the many groups was quite minimal. As such, the "range of variation" of the interpersonal and task cohesion constructs measured may have been restricted.

Secondly, the questionnaire used to collect much of the data for this study was long (over 65 questions). As such, the potential for scale order effects response bias and some degree of respondent fatigue was present. As this was recognized, two forms of the questionnaire were used with the various scales placed in different orders in hopes that any scale order effects bias and respondent fatigue bias would be balanced. Despite this effort, the potential remains for some response bias.

Finally, this study does not claim to be a comprehensive examination of all the cohesiveness scales available. The scales used in the study were just a small sample of many excellent and thoroughly researched cohesiveness measurement scales. Some researchers might rightfully claim that the findings would have been different with the use of different scales. Future research, employing other scales, is needed.

In conclusion, the findings from this research would suggest that: (a) cohesiveness is a multidimensional construct composed of interpersonal cohesion and task cohesion; (b) task cohesion seems to be an outcome, not a determinant, of performance; (c) interpersonal cohesion seems to be stable over time regardless of simulation game performance; and (d) task cohesion seems to change over time and change in the direction of simulation competition performance

## REFERENCES

Available On Request

this result, it is reasonable to hypothesize that team cohesiveness is a determinant of simulation performance and not a result of it.

The organizational psychology, social psychology, and sport psychology literature has a strong research tradition on the construct of cohesiveness. Mudrack (1989), for example, reviewed thirty-four organizational research studies, which measured group cohesiveness and productivity. He reports that only thirteen of the studies explicitly measured cohesiveness and the findings of these thirteen were mixed. In seven studies a positive relationship between cohesiveness and productivity was reported. Two studies reported a negative relationship, with the remainder of the studies reporting mixed results. These findings are certainly less clear than those reported in the recent simulation literature.

Mudrack (1989) concluded that cohesiveness needed to be reconceptualized in the organizational psychology literature. He suggested that the sport psychology literature provides several useful conceptualizations of cohesiveness and recommends the use of multiple measures of cohesiveness instead of single measures. Mudrack (1 989) advocates the use of several existing cohesiveness scales to measure the construct. He suggests Dobbins and Zaccaro's (1986) scale and Seashore's (1954) scale as two possible multiple measures of cohesiveness for use in research.

In the social psychology literature, Zacarro and Lowe (1988) and Zaccaro (1991) consider the issue of cohesiveness measurement as well. Their research examined cohesiveness as a multidimensional construct composed of cohesion to task and interpersonal cohesion with the group. It was their assertion that high task cohesion was necessary for groups to be productive but high interpersonal cohesion was not necessarily related to productivity. They did suggest, though, that synergy could exist in which groups that were high in both task and interpersonal cohesion could achieve even higher productivity. The notion of cohesiveness as a multidimensional construct is supported by other social psychology researchers (e.g., Parsons 1951; Mikalachki 1969; Fisher 1973; Carron 1982; Carron, Widmeyer.and Brawley 1985; Bollen and Hoyle 1990).

In the simulation literature, most past research has examined either the relationship between beginning team cohesion (measured via questionnaire) and final simulation performance or ending team cohesion and ending simulation performance. Wellington and Faria (1992) measured team cohesion during each simulation decision period and related group cohesion to both performance during that period of the competition and to final game performance. They found that team cohesion remained fairly stable over the course of the simulation, even when simulation performance was erratic, suggesting that cohesiveness was a determinant of performance and not a result of performance. No reported research in the simulation literature has examined cohesiveness as a multidimensional construct.

**Measures Of Team Cohesion**

An examination of the literature shows that there are almost as many measures of team cohesion as there are studies on the topic. As such, it was not feasible to use all past measures in this study. Furthermore, measures had to found that could represent either or both of the construct dimensions
    task cohesion and interpersonal cohesion. Measures were sought for use, then, if they could represent one of the dimensions; had a positive track record of use; had reasonably high reported internal consistency reliability (alpha or split-half reliability near .80 or higher); and were not composed of an extremely large number of items.

Using these criteria, the measures of interpersonal cohesiveness selected for use in this study were those developed by Wheeless, Wheeless and Dickson-Markman (1 982); Evans and Jarvis (1986); Dobbins and Zaccaro (1986); and Wellington and Faria (1992).

Wheeless, Wheeless and Dickson-Markman (1 982) developed an 1 8 item (split-half reliability of .90) group solidarity scale specifically to measure interpersonal cohesion. This scale, along with Evans and Jarvis' (1986) scale, was used in a study by Keyton and Springston (1990) to validate a cohesiveness construct they were developing. Keyton and Springston (1990) report internal consistency reliabilities of .888 and .957 for the Wheeless, Wheeless and Dickson-Markman and Evans and Jarvis scales, respectively.

Evans and Jarvis (1986) developed a 20 item 9

point Likert scale which was tested on a number of groups. Evans and Jarvis (1986) report scale reliabilities as measured by co-efficient alpha ranging from .90 to .97 which included test-retest reliability situations. The Evans and Jarvis scale was also used by Keyton and Springston (1990) as described above.

Dobbins and Zaccaro's (1986) cohesiveness scale is an eight item, seven point Likert scale with a reported alpha reliability of .91. This scale was developed as a mix of items from several previously used cohesiveness scales. Mudrack (1 989), based on an examination of thirty-four cohesiveness studies, recommends use of the Dobbins and Zaccaro scale.

Wellington and Faria's (1992)-team cohesiveness scale was developed specifically for use in simulation research. It has a reported alpha internal consistency reliability of .927 and is primarily an interpersonal cohesiveness scale. The scale has been cross validated with a global measure of cohesiveness and has been used in a number of simulation studies.

The measures of task cohesiveness that were selected for use in this study were developed by Seashore (1954) and Martens and Peterson (1971). Mudrack (1989) identifies Seashore's (1954) scale as one, which might covary with measures of commitment to task so its selection for this purpose has support from the literature. Bollen and Hoyle (1990) report that Seashore's (1954) scale is one of the most well known and used scales for measuring cohesiveness. Keller (1986) used Seashore's scale in a study on small group project performance and reports an internal consistency reliability of .77 and Wolfe, Bowen and Roberts (1989) report an alpha reliability of .87 using the Seashore scale.

Martens and Peterson's (1971) scale is designed to measure teamwork and as such it was considered more of a "task" oriented type of cohesiveness measure as opposed to an "interpersonal cohesiveness measure. Melnick and Chemers (1974) used this scale to measure cohesiveness and its effect on the success of basketball teams. Unfortunately, the reliability of the scale was not reported. However, the Martens and Peterson scale was selected for use in this study based on the fact that it was one of the few task cohesion scales available and it produced an internal consistency

reliability of alpha = .874 in a questionnaire pretest.

Because Seashore's (1954) and Martens and Peterson's (1971) scales were not specifically designed to measure task cohesion in a simulation gaming situation, it was decided to develop and use a simulation based task cohesiveness scale. This "simulation competition scale was developed and then tested along with the other scales in a questionnaire pretest which was undertaken with 60 introductory marketing students who attended a summer school class. The results of the questionnaire pretest indicated that the simulation competition scale possessed convergent validity with the other scales and had an internal consistency reliability of alpha = .776. Although the internal consistency reliability of the simulation competition scale was less than .80 it is fairly close and within acceptable limits for research (Nunally 1978 p. 245) so it was utilized in the final study.

## PURPOSE AND HYPOTHESES

The findings from previous research would suggest that high team cohesiveness is associated with superior simulation game performance. While these findings are certainly intuitively appealing, with the exception of Wellington and Faria (1992), virtually all previous results reported have used a one time measure only, taken either at the start or at the conclusion of the competition. Wellington and Faria (1992) measured team cohesion and participant attitudes toward the simulation competition over the course of the competition. The findings reported by Wellington and Faria (1992) were that team cohesion remained stable regardless of simulation team performance. This would suggest that teams remained committed to each other whether things were going very well or not going very well. However, Wellington and Faria (1992) measured cohesion with only one scale, taking the view that group cohesiveness was a unidimensional construct.

Based on the literature review and the findings from previous research on cohesiveness, the following hypotheses have been formulated for testing purposes:

H1:     Simulation teams with higher beginning interpersonal cohesiveness will perform better than teams with lower beginning interpersonal cohesiveness.

H2:     Simulation teams with higher beginning task cohesiveness will perform better than teams with lower beginning task cohesiveness.

H3:     Simulation teams with higher ending rank order performance will exhibit higher ending interpersonal cohesiveness than poorer performing teams.

H4:     Simulation teams with higher ending rank order performance will exhibit higher ending task cohesiveness than poorer performing teams.

H5:     Beginning interpersonal cohesiveness will be strongly correlated to ending interpersonal cohesiveness.

H6:     Beginning task cohesiveness will be strongly correlated to ending task cohesiveness.

Four distinct possibilities exist with regard to the above hypotheses: 1) If Zaccaro and Lowe's (1988) conception of cohesiveness as a multidimensional construct composed of task cohesion and interpersonal cohesion is correct, the implication is that interpersonal cohesion should not be related to simulation game performance while task cohesion should be. Furthermore, if task cohesion is a determinant of performance and not an effect, it would be expected that Hi, H3 and H6 should be rejected and H2, H4 and H5 should be accepted. 2) If cohesiveness is a multidimensional construct and is an outcome of performance, Hi, H2, H3 and H6 should be rejected and H4 and H5 should be accepted. 3) If cohesiveness is a unitary construct and a determinant of performance, H1, H2, H3, H4, H5 and H6 should be accepted. 4) - If cohesiveness is a unitary construct and relates to performance as an effect, then H1, H2, H5 and H6 should be rejected and H3 and H4 should be accepted. Any pattern of hypothesis acceptance or rejection other than these four possibilities would be evidence of rejection of much of the theoretical rationale put forth in this paper.

## METHODOLOGY

The subjects for the research to be reported here were 316 students in two sections of a principles of marketing course. Both sections were taught by the same instructor, used the same textbook, viewed the same videos, and took common multiple choice midterm and final exams. The simulation game used was The Marketing Management Simulation (Faria and Dickinson 1994), a simulation game specifically developed for use in introductory marketing courses. Students were divided into teams of three or four players. In total, 96 teams in 16 industries of six teams each were formed with 91 teams completing the simulation competition.

In both sections of the course, ten decisions were made in the simulation competition and the simulation game counted towards 20 percent of the students' final grade in the course. The simulation exercise was split into two rounds, a four period trial round where earnings performance was not graded and a six period performance round where earnings performance relative to other teams was graded. In addition to making decisions in the simulation competition, the students were required to complete a self-report attitude survey to be submitted with the first and third decisions of the trial round and then with the first, fourth and last decisions of the performance round. Thus, a total of five attitude reports were submitted.

Interpersonal cohesiveness was measured using four different scales as follows: Wellington and Faria's (1992) seven point strongly agree strongly disagree simulation team cohesiveness scale (3 item scale, mean alpha reliability = .89); Wheeless's (1982) seven point strongly agree - strongly disagree group solidarity scale (18 item scale, mean alpha reliability = .94); Dobbins and Zaccaro's (1986) seven point strongly agree - strongly disagree group cohesiveness scale (8 item scale, mean alpha reliability = .89); and Evans and Jarvis' (1986) nine point numerical Likert Group Attitude Scale (20 item scale, mean alpha reliability =.91).

Task cohesiveness was measured using three different scales: a seven point strongly agree strongly disagree simulation task cohesiveness scale developed for this study (3 item scale, mean alpha reliability = .70); Martens and Peterson's (1971) nine point semantic differential task cohesiveness scale (4 item scale, mean alpha reliability = .92); and Seashore's (1954) cohesiveness scale (5 item scale, mean alpha reliability = .80). Simulation performance was measured as final team ranking within each industry at the conclusion of the performance round.

H1, and H2 were tested with a Kruskal-Wallis one-way analysis of variance for ranks using high, medium and low ratings for the interpersonal and task cohesion scales as factor variables and group rank order finish performance as the dependent variable. H3 and H4 were tested using ANOVA with ending rank order performance divided into high, medium and low categories as factor variables versus the dependent variables of ending interpersonal cohesion and task cohesion. H5 and H6 were tested by taking a simple bivariate correlation between the first trial period reported interpersonal and task cohesion scores and the final period reported scores for these variables.

## FINDINGS

The overall findings from the Kruskal-Wallis one-way analysis of variance of ranks for Hi and H2 are reported in Table 1. The findings would support the rejection of Hi and H2. The findings from the ANOVA analyses are reported in Table 2. These findings support the acceptance of H4 and the rejection of H3. The correlation analysis results for H5 and H6 are reported on in Table 3. These findings support the acceptance of H5 and the rejection of H6. In short, the findings indicate, as suggested earlier, that cohesiveness is a multidimensional construct and is an effect, or outcome, of performance.

To test H1 and H2, the simulation teams were divided into high, medium and low groups with respect to task and interpersonal cohesion based on the results of questionnaire responses submitted with the first trial decision. Beginning team interpersonal and task cohesion were analyzed in relation to ending simulation competition ranking. The non-significant Kruskal-Wallis one-way analysis of variance of ranks results reported in Table 1 supports the rejection of both Hi and H2. Teams that were more interpersonally cohesive or task cohesive at the start of the simulation competition did not outperform teams that were less cohesive. This suggests that beginning task cohesiveness and interpersonal cohesiveness are not related to ending performance and, therefore, do not have a direct causal influence on performance.

H3 and H4 examined changes in interpersonal and task cohesion over the course of the simulation competition. The findings from the ANOVA analysis indicate that task cohesiveness over time was related to rank order finishing

position thus supporting the acceptance of H4. Three of the four interpersonal cohesiveness scales, however, showed no relationship to rank order-finishing position. This, then, would result in the rejection of H3.

H5 and H6 consider the stability of cohesion over time during the simulation game. If the strength of correlation between beginning and ending interpersonal and task cohesion is high, this suggests these variables are stable. If these variables should be related to performance, a causative relationship could be inferred. On the other hand, if the correlation is not strong, this would suggest that these variables are not stable and may have changed due to performance feedback.

The findings shown in Table 3 suggest that beginning and ending interpersonal cohesion were strongly correlated ($r > .5$ and significant at .000, see Cohen and Cohen 1983) except for Wellington and Faria's (1992) scale which showed a medium-strong correlation ($r > .4$ but $< .5$), and that task cohesion exhibited a medium-strong correlation ($r > .4$ but $< .5$ and significant at .000).

## DISCUSSION AND CONCLUSIONS

The research reported here sought to examine the relationship between business simulation game performance and team cohesiveness as a multidimensional construct composed of interpersonal cohesiveness and task cohesiveness. The findings indicate that self-reported beginning interpersonal cohesion and task cohesion were not related to final simulation game rank performance. With the exception of Wellington and Faria's (i 992) scale, interpersonal cohesion did not change over time to reflect changes in team performance. The implication of this finding is that neither interpersonal nor task cohesion is a determinant of ending team performance and interpersonal cohesion is stable over time.

With respect to ending team performance, it was found that ending task cohesion was universally related to ending rank performance. Only one interpersonal cohesion scale, however, was related to ending rank performance. The scale exhibiting the significant relationship was Wellington's which was designed specifically to measure group cohesion in a simulation competition. The pattern of

## TABLE 1
### KRUSKAL-WALLIS ONE-WAY ANALYIS OF VARIANCE
### RESULTS FOR H1 AND H2

H1

| Interpersonal Cohesiveness | N | Mean Rank by Group High | Med | Low | Chi-square | Significance |
|---|---|---|---|---|---|---|
| Wellington's | 280 | 136.20 | 141.70 | 144.60 | 00.53 | .760 |
| Dobbin's | 280 | 142.11 | 134.39 | 145.79 | 00.95 | .622 |
| Wheeless' | 281 | 138.34 | 141.02 | 143.51 | 00.19 | .910 |
| Evan's | 278 | 134.18 | 144.01 | 145.59 | 01.09 | .579 |

H2

| Task Cohesiveness | N | Mean Rank by Group High | Med | Low | Chi-square | Significance |
|---|---|---|---|---|---|---|
| Simulation's | 280 | 136.29 | 146.52 | 136.07 | 01.11 | .573 |
| Seashore's | 281 | 145.37 | 142.31 | 133.80 | 00.89 | .641 |
| Martens' | 281 | 134.88 | 146.22 | 143.27 | 01.02 | .600 |

** = p<.05

## TABLE 2
### RESULTS OF ANOVA TESTS OF H3 AND H4

H3

| Interpersonal Cohesiveness | N | Mean Cohesiveness by Rank High | Med | Low | F-Value | Significance |
|---|---|---|---|---|---|---|
| Wellington's | 256 | 1.64 | 1.89 | 2.09 | 03.74 | .025** |
| Dobbin's | 258 | 1.98 | 2.13 | 2.22 | 01.20 | .304 |
| Wheeless' | 258 | 2.23 | 2.26 | 2.52 | 02.40 | .092 |
| Evan's | 259 | 2.26 | | 2.73 | 02.99 | .052 |

H4

| Task Cohesiveness | N | Mean Cohesiveness by Rank High | Med | Low | F-Value | Significance |
|---|---|---|---|---|---|---|
| Simulation's | 258 | 1.58 | 2.14 | 2.58 | 20.38 | .000** |
| Seashore's | 258 | 1.30 | 1.33 | 1.52 | 05.27 | .006** |
| Martens' | 256 | 1.99 | 2.10 | 2.64 | 06.61 | .002** |

** = p<.05