An Investigation of the Relationship Between Managerial Personality Type and Computer Use

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The direct use of computers by managers is bringing about one of the most dramatic changes in managerial work style that has ever been seen. This paper describes some of the results of a study of nearly one hundred fifty managers. It explores the interaction between managerial personality type according to the Jungian typology and computer use time. Significant results were found that indicate (contrary to expectations): 1) Feeling types spend more time using computers than do Thinking types, and 2) Intuitive types may also spend more time using computers than do Sensing types.

The implementation of personal computers (PCs) in the office environment is but one more dimension of the general management information system and decision support system (MIS/DSS) design problem. The relatively recent rapid growth in the implementation of these systems has raised new issues and problems for organizations to contend with, because these systems are being used by persons who differ substantially from those who had historically been direct computer users. The traditional computer users who in previous years had direct contact with the hardware system have been data processing personnel, clerical personnel, and technically oriented specialists. The “hands on” use of computers by managers and executives is a relatively recent phenomenon which has been accelerated greatly by the advent of the personal computer. It is important to learn how this new tool is being utilized by managers in the performance of their jobs, and what factors relate to effective use. The authors have completed an investigation of several such factors, and have found an interesting relationship involving the personality type of the user.

Background

The personal characteristics of the MIS user have long been thought to play an important role in MIS implementation and utilization, as is evidenced in the classical MIS research frameworks proposed by Mason and Mitroff (1973), Lucas (1973, 1975), Chervany, Dickson, and Kozar (1972), and Ives, Hamilton, and Davis (1980). The aforementioned paradigm shift to end user computing has resulted in numerous studies of end user characteristics, such as those by Amoroso (1992), Harrison and Rainer (1992) and Schiffman, Meile, and Igbaria (1992).

Of the many personal characteristics that have received attention, personality is one that has often been mentioned as being potentially important (Mason & Mitroff, 1973; Bariff & Lusk, 1977; Keen & Bronsema, 1981; Kaiser & Bostrom, 1982; Lederer & Smith, 1988; Mawhinney & Saraswat, 1991; Pocius, 1991). One of the more widely used personality constructs in MIS research is the Jungian typology (Jung,
Its use has been recommended by Mason and Mitroff (1973), Keen and Bronsma (1981), Kaiser and Bostrom (1982), Lederer and Smith (1988), Mawhinney and Saraswat (1991), and Pocius (1991). The Jungian typology consists of eight factors that are arranged as bipolar preferences along four dimensions:

- Extroversion (E) - Introversion (I)
- Sensing (S) - Intuition (N)
- Thinking (T) - Feeling (F)
- Judging (J) - Perceiving (P)

Extroverts tend to be oriented toward the outer world of people, while Introverts tend to be more comfortable in the inner world of ideas. The Sensing/Intuition dimension deals with how a person perceives information. The Sensing type has a preference for hard facts, whereas the Intuitive type tends to look for relationships. The Thinking/Feeling dimension deals with how a person makes decisions. The Thinking type tends to make decisions based on logic and analysis, while the Feeling type tends to make decisions based on emotions and personal values. The Judging/Perceiving dimension relates to how a person deals with the world. The Judging type tends to prefer a planned, orderly life, while the Perceiving type tends to prefer a more spontaneous and flexible life. Although a given individual would typically use all eight factors to some degree, usually one factor in each pair tends to be developed to a greater extent than the other. When these dominant preferences from the four dimensions are combined, it results in one of sixteen different personality types.

Most MIS-related research has focused specifically on the Sensing/Intuition and Thinking/Feeling dimensions. The Sensing/Intuition dimension can be viewed as a “data input” mode for the decision making (“processing”) that takes place in the Thinking/Feeling dimension. When these two dimensions are juxtaposed, it results in four personality types:

- Sensing-Thinking (ST)
- Sensing-Feeling (SF)
- Intuition-Thinking (NT)
- Intuition-Feeling (NF)

These two types are complete opposites. They have conflicting methodologies for decision making and different needs for information. This results in potential conflicts in designer/user relationships in systems design (Mason & Mitroff, 1973; Kaiser & Bostrom, 1982). However, empirical research has not generally supported this hypothetical designer/user personality type difference. Keen and Bronsma (1981) and Kaiser and Bostrom (1982) have shown that both managers and data processing personnel tend to be predominantly Thinking types, rather than Feeling types. Although the results for the Sensing/Intuition dimension are not quite as consistent, in most cases the majority of both users and analysts have been Intuitive types. The studies of data processing personnel by Lyons (1985) also consistently showed the Intuitive types to be in the majority.

The Hypotheses

This research explored the utilization of computers by managers. Reported computer use time in hours per week was used as a measure of utilization. Although it would be more desirable to measure the “quality of managerial decision making” as the dependent variable, this is very difficult to accomplish in a field setting. Several authors have suggested that system use has been an acceptable surrogate (Lucas, 1975; Ives, et al., 1980; Ives, Olson, & Baroudi, 1983). Studies of personal computer use by Snitkin and King (1986) and Gremillion and Hopkins (1986) utilized self-reported use times as variables.

Personality type of the user was the independent variable. As described in the preceding section, traditional theory suggests that the Sensing and Thinking types would be attracted to the highly technical data processing profession (Kaiser & Bostrom, 1982). Sensing types tend to be data-oriented and prefer to work with facts. Thinking types tend to base their judgments on impersonal analysis and logic. Myers (1962) suggested that the antithetical Intuitive and Feeling personality types would be attracted to work which involves interactions with people, such as teaching and counseling. Intuitive types would rather deal with possibilities and relationships than known facts. Feeling types tend to base their judgments on personal values. A logical consequence is that the ST personality type would tend to be attracted to computers, while the extremely opposite NF personality type would be more attracted to other activities. This results in the following hypotheses:

H₁: Sensing types will use computers more than will Intuitive types.
H₂: Thinking types will use computers more than will Feeling types.
Consequently:
H₃: In the two-dimensional typology (ST, SF, NT, NF), persons with an ST personality type will use computers the most, while persons with an NF personality type will use computers the least.

The Methodology

The methodology used in this research was a single-stage blind mail survey. The questionnaire included self-estimates of computer use time whereby respondents were asked to estimate the number of hours per week of work time that was spent using a computer. Characteristics of the computer (including type, brand, and model) were also solicited so that the type of computer being used (PC, mainframe, or mini) could be identified. The Hogan and Champagne (1980) “Personal Style Inventory” (PSI) was used as a Jungian measure and was directly incorporated into the questionnaire with some minor modifications. The PSI contains 32 items, equally distributed along the four Jungian dimensions. It has been previously used in a study of personality type and computer anxiety in college students (Mawhinney & Saraswat, 1991).

Most previous researchers have used the Myers-Briggs Type Indicator (MBTI) described by Myers (1962). Although the MBTI is usually the instrument of choice for measuring the Jungian typology, there are several reasons which inhibit its use for blind mail surveys. The widely used Form G is relatively long, containing 126 items. Although the Abbreviated Version (AV) is of a more desirable length, containing only 50 items, it was designed as a self-scored workshop instrument. This can result in possible biases when the respondents look at the objectives of the test and the scoring methodology. Copyright restrictions prohibit the incorporation of either form of the MBTI into other questionnaires. In their published form, they are both very obvious psychological tests, which could result in a reduced response rate (possibly in a fashion that is related to personality).

A reliability and validity assessment of the PSI was conducted by Mawhinney and Lederer (1988) which utilized approximately 140 undergraduate business students. The average test-retest reliability across the four dimensions was found to be 0.67. The average split-half reliability was 0.55. A Spearman-Brown projection of the split-half reliabilities resulted in values that were very close to those published for Form F of the MBTI (Myers, 1962). This would suggest that the inherent reliability of the PSI differs from that of the MBTI only because it contains fewer items.

Mawhinney and Lederer also directly compared the PSI with the MBTI/AV to determine its concurrent validity with that instrument. The average correlation for the four dimensions was found to be 0.46. Cronbach (1970) indicated that validity coefficients in this range were both common and acceptable. Internal consistency measures of the construct validity of the PSI yielded results that were similar to those of the MBTI/AV.

Characteristics of the Subjects

Two groups of subjects were utilized in this survey. The groups were “convenience samples” of managers who could reasonably be expected to have a relatively high incidence of personal computer utilization. Group A was the set of graduates of a special “executive” MBA program at a large university in the northeastern United States. Group B was the membership of a chapter of a national professional organization that deals with production and inventory management. The two groups together had approximately 850 members, with no overlap.

Although the members of both groups were predominantly managers, there were some differences between the two groups which should be noted. Group A can be viewed as a horizontal sample which is fairly representative of “general management.” Group B can be viewed as a vertical sample from a functional area which has a fairly strong technical orientation.

Questionnaires were sent to 373 members of Group A and 475 members of Group B. A total of 249 persons responded, yielding a response rate of 30%. Given the size and nature of the questionnaire, the overall response rate was somewhat higher than anticipated.

Almost all of the respondents in this original set were managers. About one-third of the respondents were employed by organizations that exceeded one million dollars in annual revenues. Overall, the organizations for which the respondents worked employed an average of fifteen thousand persons. Both groups represented a broad range of levels in the organizational hierarchy, with a substantial representation from the higher tiers of management.

The 249 responses to the questionnaire were screened to remove those that were not managers. Non-managers were removed on the basis of the level of their positions in the organization and the number of their direct subordinates. Thus, the “managers” used in this analysis were consistent with McLeod’s (1993) definition. This resulted in a final sample of 147 managerial computer users, 78 of which were from Group A, and 69 of which were from Group B.

Table 1 provides a two-dimensional summary of some of the demographic variables described in the previous two paragraphs. A statistical analysis comparing the means of the items for the four groups indicated that there was no difference in organizational size based on either annual revenues or number of employees. However, the average organizational level of the managers was significantly higher than that of the non-managers. It is also interesting to note that more than two-thirds of the managerial computer users were primarily using PCs rather than mainframe or minicomputers, indicating that the PC has become the platform of choice for managerial end-users.

Computer use was a relatively important activity for the samples that were used in this analysis. Group B averaged 6.7 hours/week using a computer, which was 29 percent higher than the average for Group A, which was 5.2 hours per week.
The respondents were also asked to estimate the amount of
time that they spent in other work activities. In terms of work
time spent in an activity, computer use time was the second
most important activity for Group B. Time spent in data
analysis was the most important activity for them, averaging
7.6 hours per week. Time in meetings was the most important
activity for Group A, averaging 9.3 hours per week. Computer
use was their sixth most time-consuming activity, ranking
after telephone conversations (7.0 hr.), direct supervision (6.6
hr.), reading (5.9 hr.), and writing (5.6 hr.).

Figure 2 portrays the personality type distribution for the
combined groups along each of the four primary dimensions
(E/I, S/N, T/F, and J/P). The most conspicuous characteristic
of Figure 2 is the prevalence of Thinking types relative to
Feeling types and the prevalence of Judging types relative to
Perceiving types. This is consistent with what Keen and
Bronsema (1981) and Kaiser and Bostrom (1982) reported for
managers, and with what Lyons (1985) reported for data
processing personnel. They also had observed consistently
high proportions of Thinking types relative to Feeling types,
and Judging types relative to Perceiving types. This supports
the contention of Keen and Bronsema (1981) that managers
are predominantly Thinking types, rather than Feeling types,
which was contrary to previous theory. The Judging/Perceiving
dimension has not received much attention in the previous
MIS literature, except by Keen and Bronsema (1981), who
hypothesized that managers would be predominantly Judging
types.

The other two dimensions show a more even balance,
with the Extroverts only slightly outnumbering the Introverts,
and the Intuitive types equalling the Sensing types. These
proportions are also consistent with those reported previously
by Keen and Bronsema (1981), and Kaiser and Bostrom
(1982). Lyons (1985) reported similar results for data
processing personnel for the Sensing/Intuitive dimension, but
dissimilar results for the Extrovert/Introvert dimension where
two-thirds of his respondents were Introverts.

Figure 3 is a scatter plot of the net scores for the two-
dimensional categorization: Sensing/Intuition by Thinking/
Feeling. The net scores on the vertical dimension were
obtained by subtracting the subtotal for Feeling from the
subtotal for Thinking for each respondent. The net scores on
the horizontal dimension were obtained by subtracting the
subtotal for Sensing from the subtotal for Intuition for each
respondent.

There are two striking characteristics of this distribution
of personality types. The first characteristic is the high
proportion of points above the horizontal axis. This indicates
prevalence of Thinking types compared to Feeling
types, as described previously. The second characteristic is
the almost total lack of points in the lower left quadrant, which
indicates a near absence of the SF personality type in the two
sample groups used in this study. This pattern is fairly
consistent with that reported by Kaiser and Bostrom (1982).
Keen and Bronsema (1981) did not provide this information
for the groups they investigated.

The reliability of the PSI was re-assessed using
Cronbach’s alpha measure of internal consistency. The entire
sample including non-managers and non-users was used for
this purpose (n = 223). This resulted in the reliability values
shown in Table 2. These values are consistent with those
published previously by Mawhinney and Lederer (1988).
While these reliabilities are not sufficiently strong to warrant the use of this instrument for clinical diagnosis and counseling, they are in the range considered to be marginal to acceptable for investigating group behavior as is the case in this study (Cronbach, 1970).

**Results**

The three hypotheses were tested through analysis of variance. Neither of the two sample groups was overly large. Consequently, the sample groups were tested individually and also as one large, combined sample. This treatment provides the opportunity to observe whether a given effect is characteristic of only one of the two groups.

Hypothesis 1 stated that “Sensing types will use computers more than will Intuitive types.” The analysis of variance results are listed in Table 3. A visual inspection of the sample averages indicates that in all cases the Intuitives report using computers more hours per week than do the Sensing types. This is exactly the opposite of what Hypothesis 1 stated.

However, this difference is only significant for Group A, where it is significant at the 0.10 level.

Hypothesis 2 stated that “Thinking types will use computers more than will Feeling types.” The analysis of variance results are listed in Table 4. A visual inspection of the sample averages indicates that in all cases the Feeling types report using computers more hours per week than do the Thinking types. This again is in the opposite direction of what was stated in Hypothesis 2. This outcome is significant for Group A at the 0.05 level, and is significant for Group B at the 0.10 level, indicating a consistent pattern. For the combined groups this outcome is significant at the 0.01 level.

Hypothesis 3 stated that “In the two-dimensional typology (ST, SF, NT, NF), persons with an ST personality type will use computers the most, while persons with an NF personality type will use computers the least.” The analysis of variance results are listed in Table 5. The null hypothesis that average reported computer use time is the same for all four personality types (ST, SF, NT, NF) is rejected at the 0.10 level for both Group A and for the combined groups. Although Group B did not show significance at a sufficiently strong level to reject the null hypothesis, an examination of the group means suggests that Group B follows a pattern that is similar to Group A. Its lack of significance was quite possibly due to the smaller sample size.

A visual inspection of the sample averages again indicates
that the observed outcome is in the opposite direction from that stated in the hypothesis. Multiple range tests were conducted to determine which means were significantly different. The “least significant difference” (LSD) methodology was used for the multiple range tests. These results are also listed in Table 5. They indicate that the NF personality type reports using computers significantly more hours per week than the ST personality type. This is significant at the 0.05 level for Group A and for the combined groups. Furthermore, the NF personality type reports using computers significantly more hours per week than the NT personality type at the 0.05 level for Group A and for the combined groups.

### Discussion

This research has found that the NF personality type reports using computers more than the ST personality type. This outcome appears to be most consistent along the Thinking/Feeling dimension, where the Feeling types for both sample groups reported using computers nearly twice as many hours per week than did the Thinking types. The outcome was less consistent along the Sensing/Intuition dimension, with only one of the two groups showing a significant difference at the 0.10 level. However, for that group the Intuitive types reported using computers almost twice as many hours per week than did the Sensing types. These results do not support Hypotheses 1, and clearly contradict both Hypothesis 2 and Hypothesis 3.

Other items on the questionnaire were examined in an attempt to find an explanation for the unexpected contradiction of the hypotheses. One possible explanation is that the NF personality type is less competent than the ST type at using computers. Consequently, it may simply take the NF type longer to accomplish the same amount of work as the ST type. If this were the case, then user competence with the system becomes an important independent variable. There was no item on the questionnaire that directly assessed user competence with the system. However, there was an item included that did relate to system competence. The respondents were asked if they had ever taken a typing or keyboarding course.

It is likely that typing ability plays some role in computer utilization. Persons who are less proficient with a keyboard would take longer to complete the same amount of work. Although managers would typically not engage in keyboard intensive applications, such as data entry and word processing,

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**Table 4: Thinking/Feeling vs. Computer Use Time**

<table>
<thead>
<tr>
<th>JUNGIAN TYPE</th>
<th>n</th>
<th>Avg</th>
<th>n</th>
<th>Avg</th>
<th>n</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking</td>
<td>121</td>
<td>5.31</td>
<td>66</td>
<td>4.67</td>
<td>57</td>
<td>6.04</td>
</tr>
<tr>
<td>Feeling</td>
<td>26</td>
<td>8.58</td>
<td>14</td>
<td>7.64</td>
<td>12</td>
<td>9.67</td>
</tr>
<tr>
<td>F-Ratio</td>
<td>7.251***</td>
<td>4.684**</td>
<td>3.097*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p ≤ 0.10 ** p ≤ 0.05 *** p ≤ 0.01

**Table 5: 2-Dimensional Personality Type vs. Computer Use Time**

<table>
<thead>
<tr>
<th>PERSONALITY TYPE</th>
<th>n</th>
<th>Avg</th>
<th>n</th>
<th>Avg</th>
<th>n</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensing-Thinking (ST)</td>
<td>66</td>
<td>5.29</td>
<td>30</td>
<td>3.97</td>
<td>36</td>
<td>6.39</td>
</tr>
<tr>
<td>Sensing-Feeling (SF)</td>
<td>8</td>
<td>7.38</td>
<td>1</td>
<td>3.00</td>
<td>7</td>
<td>8.00</td>
</tr>
<tr>
<td>Intuition-Thinking (NT)</td>
<td>55</td>
<td>5.35</td>
<td>34</td>
<td>5.29</td>
<td>21</td>
<td>5.43</td>
</tr>
<tr>
<td>Intuition-Feeling (NF)</td>
<td>18</td>
<td>9.11</td>
<td>13</td>
<td>8.00</td>
<td>5</td>
<td>12.00</td>
</tr>
</tbody>
</table>

| Total                   | 147| 5.89| 78 | 5.21| 69 | 6.67|

| F-Ratio | 2.569 * | 2.363 * | 1.484 |

<table>
<thead>
<tr>
<th>LSD Multiple Range Test</th>
<th>ST vs NF **</th>
<th>ST vs NF **</th>
<th>NT vs NF **</th>
</tr>
</thead>
</table>

* p ≤ 0.10 ** p ≤ 0.05 *** p ≤ 0.01
the keyboard was still the primary device for entering commands to interact with application software at the time of this study.

Table 6 lists the proportion (p-bar) of persons that reported a “Yes” response to this question for each personality type. A contingency table test utilizing a chi-squared statistic was used to test for the equality of proportions. The Yates continuity correction was applied in those cases where an expected frequency of less than ten occurred, as recommended by Downie and Heath (1965). Although it appears as if a consistently higher proportion of ST types reported having taken a typing course than did the NF types, this difference was significant at the 0.05 level for the combined group, where 70% of the STs compared with only 44% of the NFs had taken such a course. This difference appears to be primarily attributable to the Thinking/Feeling dimension, where consistently fewer Feeling types had taken a typing course than did the Thinking types. This relationship was significant at the 0.10 level for Group A, and was nearly significant at the 0.10 level for the combined groups. No significant difference was found on the Sensing/Intuition dimension.

Numerous other variables were included in the questionnaire. Some of these other variables were: 1) how much time was spent on the average in specific activities, such as supervising subordinates and analyzing data, 2) the amount of time spent using specific types of software, such as spreadsheets and word processing, 3) span of control, and 4) level in the organization. An assessment was also made of whether each respondent worked in a technical/quantitative or nontechnical/nonquantitative position based on job title, department name, and the job title of the respondent’s direct supervisor. However, when compared on the basis of personality type, none of these other variables showed results that were as consistent or as strongly significant as that shown for having taken a typing course as depicted in Table 6.

Conclusions and Recommendations

It has been demonstrated that a fairly consistent relationship between computer use time and managerial personality type does indeed exist, although not in a direction which is consistent with traditional thinking. The NF personality type appears to use computers substantially more than the ST personality type. This relationship appears to be most consistent on the Thinking/Feeling dimension. The Feeling types consistently report using computers significantly more hours per week than the Thinking types. There appears to be a possible relationship involving the Sensation/Intuition dimension, but it is not as strong. For one group, the Intuitive types did report using computers substantially more hours per week than did the Sensing types. The data suggests that a possible explanation for these results is an apparent difference in typing skills.

More research is certainly necessary to determine whether the relationships shown here are pervasive, and to better explain why NF types report using computers more hours per week than do ST types. Other groups of managers need to be examined, preferably using the more widely accepted MBTI. Such future research should explore the role of how mandatory versus discretionary computer use relates to user personality type. Managerial computer use can be mandated by: 1) management directive, and/or 2) the nature of the task being performed. Both of these aspects need to be considered.
Although self-reported use time has been widely employed as a measure of computer utilization, no one has reported an assessment of its reliability or validity. It is quite possible that NF types think they are spending more time than they actually are. A more reliable measure is highly desirable. In today’s networked environments, it would be possible to build a mechanism into the system which would measure the activity of individual machines. In addition to facilitating end-user research, such monitoring would also be useful for providing an objective method for an organization to determine priorities for hardware and software upgrades.

If the cause of the observed relationship is verified to be a difference in typing/keyboarding skill, then those responsible for computer training should consider placing more emphasis on developing keyboarding skills. However, the recent rapid introduction of alternative interfaces may very well obviate the need for keyboarding skills. Recently, graphical user interfaces (GUIs) utilizing the point-and-click features of a mouse have replaced a substantial portion of the command driven interfaces used in businesses. Although the mouse won’t replace the keyboard for primary data entry (such as in word processing and spreadsheets), other technologies (such as handwritten character recognition, voice recognition, and scanning) are showing great promise for doing that in an economic and reliable fashion in the very near future. However, it is not clear that improvements in the user interface will affect all users equally. It is possible that some personality type(s) might benefit more than others. Future research should explore this aspect, because, if that were indeed the case, it could provide a basis for prioritizing who receives these alternative technologies.

Finally, this research carries a broad but important implication for practitioners who design today’s and tomorrow’s computer interfaces. Specifically, because different personality types use computers to different degrees, designers must now be as sensitive as they can to individual differences. Today, our society, more than ever, risks creating a culture where some individuals become proficient computer users while others do not and where the socio-economic gap between them will thus grow. Typically we assume that income and intellect separate users from the non-users but this research suggests that personality type does so, too. This may be a key fact for not only vendors of computer systems but also for managers and educators. Thus, computer interface designers must make systems as open, flexible, and accessible as possible not only to promote their individual products but also to maximize computing’s social good.

Endnote

1Form F of the MBTI is a longer version which predates Form G. Most of the published reliability and validity assessments of the MBTI were conducted using Form F.

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