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(d) No. 2 bundles not to be used for grade 1 steel

$$x_{21} = 0$$

5. The probability of producing defective output to be limited to 8

$$P\left\{\sum_{i=1}^6 E(a_i) x_{ij} > k_j \mid \sum_{i=1}^6 x_{ij} \leq \bar{e}, j = 1, 2, 3\right\}$$

6. All $x_{ij} \geq 0$

THE RELATIONSHIP BETWEEN EMPLOYEE AGE AND INTERPERSONAL TRUST WITHIN AN ORGANIZATIONAL CONTEXT

K. Dow Scott and Brian Cook*

Interpersonal trust has been found to have a major influence on human behavior (Rogers, 1961; Rotter, 1971). Extensive research in education, psychology, counseling, criminology, and communications indicates that interpersonal trust is a key ingredient in cooperative relationships. In a management context, trust has been found to be a necessary element for open, accurate communications (Mellinger, 1956). It influences the effectiveness of group problem-solving and decision-making (Zand, 1972); influences people's attitudes and feelings about the organization and their jobs (Driscoll, 1978); and determines the methods management will use to control employee behavior (Gibb, 1965). Patten (1972) contends that trust is necessary for the successful installation of a management-by-objectives program. Indeed, empirical evidence has been found to support this position (Hollmann, 1976; Scott, 1980).

Furthermore, the formation of trust is often the focus of organizational development efforts. High levels of trust are seen as linked with efficient work group functioning, long-term organizational effectiveness, and the willingness of people to make adaptations to environmental change (Kegan, 1971). Trust also affects one's willingness to share meaningful information, one's commitment to take action, and one's satisfaction in relationships with other persons (Gibb, 1965). Because trust is such a critical element for successful management, factors which influence trust should be of substantial interest. Employee age is one such factor, which in both the popular and academic literature is believed to affect trust.

Although variations in the definitions of trust exist, the essence of this concept is captured by Griffin (1976):

It (trust) is the reliance upon the characteristics of an object, or the occurrence of an event, or the behavior of a person in order to achieve a desired but uncertain objective in a risky situation (p. 105).

Trust, then, can be characterized as a positive force from which

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cooperation is derived, whereas mistrust is characterized as the unwillingness of individuals to take cooperative action which increases their vulnerability. Individuals who are mistrustful are reluctant to offer their opinions, ideas, and efforts because of perceived possible negative outcomes (Gibb, 1965).

Age is a variable that has some distinct attributes within the organizational context. First, age levels vary widely within organizations, in that individuals start jobs in their late teens and do not retire until they are in their mid-sixties. Second, employee age is positively correlated with advancement within the organization. Because higher level positions are often associated with increased responsibility and authority, organizational policies are such that employees advance upward as they obtain experience and as they prove themselves in less responsible jobs. Furthermore, competition for a higher level position is intense because obtaining advancement is a strong cultural norm, and is associated with increased status, freedom and money.

However, this relationship between age and position within the organization is certainly far from fixed. Organizational structure is such that relatively few positions exist at higher levels of the organizations. Furthermore, employee advancement does not always begin at the bottom of the job hierarchy because skill requirements may necessitate advanced education or special training to qualify for a position. Of course, there is also the political element that determines who will obtain the more desirable jobs, e.g., the president's son or daughter may have faster career progression than an employee without the family connections. As a result, although position levels within the organization and age will tend to be positively related, age variations occur within occupational groups and organization levels. Thus, it is not uncommon to have employees who are older than their superiors.

The Relationship Between Trust and Age

Birren (1960) identified chronological age as one of the single most useful pieces of information about an individual. Based on age, numerous inferences can be made about a person's anatomy, attitudes, and social behavior. Furthermore, strong societal expectations and stereotypes exist concerning the behaviors of different age groups (Neugarten, 1977). Probably the most widely known inference about trust and age is the statement, "We have a saying in

the movement that you can't trust anybody over 30." This statement, which was attributed to Jack Weinberg, characterized the attitude of the 1960's youth movement toward a society where political and economic power was held by an older strata of society. A difference in values and attitudes between age groups was implicit in this philosophy.

Anderson (1969) and Cox (1972) found that adults are more trusting than are college students utilizing the Philosophy of Human Nature (PHN) scale. However, as Wrightsman (1974) points out, no representative sample of the general adult population has been tested with the PHN scale. Furthermore, the PHN measures trust in the abstract. Participants are asked to respond to items about the general nature or roles of people, not the specific persons with whom they interact. Using a similar type of scale, Rotter (1971) found no relationship between age and trust of 18-22 year college students.

Not only has the relationship of trust and age received limited empirical examination, but Wrightsman and Rotter note their findings are absent of any theoretical explanation as to why they would expect or not expect to find a relationship. As a result, the hypotheses in this study are framed from more general research on age and an individual's response to aging and, thus, should be considered exploratory.

One premise is that the aging process will influence an individual's perception of trust in others. Neugarten (1977) proposed that people differ at different ages because they were born in a different historical period and were therefore subject to different formative experiences. For instance, those persons who had their formative years during the 1930's would have less trust in our economic system than people born after that period. Furthermore, Neugarten (1977) proposed that persons born in different historical periods would also differ because they have lived longer and therefore have a greater experience base on which to evaluate situations. This rationale supporting differences between age groups has received some empirical support. Korchin and Basowitz (1956) found that older subjects exhibited considerably more vascillation in dealing with ambiguous photographs than did the young. Vroom and Pahl (1971) also found a significant negative relationship between age and both risk taking and the value placed upon risk.

Based on Anderson's (1969) and Cox (1972's) finding that adults

were more trusting than college students as discussed, it is hypothesized (1) *that older employees will have higher levels of trust in superiors and top management than will younger employees.*

Another influence on trust perceptions may be the age of the person in which the respondent must place his or her trust. Although this issue has not been explored in terms of trust, gerontologists have long been concerned with the attitudes people have toward the aged members of society. As indicated by Bennett and Eckman (1973), young and old alike have negative attitudes about old age. Rosen and Jerdee (1976) found that older employees were perceived as more resistant to change, to lack creativity, to be more cautious, to have a lower physical capacity, to be disinterested in technological change and to be less suitable for retraining. Because older persons are perceived as less capable, it is hypothesized (2) *that younger superiors will be trusted more than older superiors.*

The difference between a superior's and subordinate's age may be a factor which influences trust rather than the absolute age of either the superior or the subordinate. Because different age groups have different values and needs, these groups will not necessarily act in the best interests of other age groups. For instance, an age group with school age children may be in direct conflict with older taxpayers on fixed income concerning real estate taxes for school support. Furthermore, because trust is based on our understanding and perceived intent of the trust object, one would predict that persons would trust other persons nearer their own age more than persons who are much older or younger. However, it is conceivable that the employment relationship also may influence the trust-age relationship. For instance, would a young employee place more trust in a superior who was his or her own age, or in a supervisor considerably older? Although the younger supervisor may have values and interests more closely aligned with the employee, competition and rivalry for status/promotions may be keen. On the other hand, even though the older supervisor has less in common with the young employee, the employee may see this person as having limited promotional opportunities or desires and, thus, be more willing to trust him/her than a superior more nearly his/her own age.

Schwab and Heneman (1978) examined the influence of age differences on evaluation of secretaries' performance. Thirty-two personnel specialists evaluated the performance descriptions of a

secretary whose age (24 or 61) was experimentally manipulated. A significant interaction effect was found between the age of the respondent and age of the evaluated secretary. Older participants gave the older secretary a lower evaluation than the younger secretary, whereas younger participants gave the older secretary a higher evaluation than the younger secretary. Thus, it is hypothesized (3) *that the greater the age difference between a superior and a subordinate, the higher will be the level of trust.*

A final consideration when examining age differences is the effect of the supervisor being either older or younger than the respondent. Although not based on theory or research evidence, one might suspect that an older employee who perceives him or herself as having invested more in the organization could resent a younger superior who has not made the same investment but who receives more rewards and authority from the organization. As such, it is hypothesized (4) *that trust in one's superior will be higher when the superior is older than the subordinate than when the superior is younger than the subordinate.*

Methodology

The data for this study were collected from a State Extension Service in the midwest. The agency is headquartered at a land grant university and has offices in each county throughout the state. It is a service organization which provides training programs and solves specific problems in the program areas of agriculture, home economics, and youth development. The subjects selected were program agents located in county offices. The agents fill two roles: (1) as an expert in a technical field, and (2) as a supervisor of other agents (county director), aides, or assistants.

The reporting relationship within this state's extension service has program agents reporting to regional supervisors who are not located in the county offices. The regional supervisors have responsibility for selection decisions, appraising performance, allocating merit budgets, and most other supervisory activities. One agent called the county extension director (CED) in each county office has the responsibility of office manager (i.e., supervises clerical employees) and interfaces with the county government. However, some regional supervisors have delegated supervisory responsibility of other agents to the CED's due to the size of the particular

county office. For this reason, some program agents consider the CED to be their primary supervisor (N = 76) as opposed to the regional supervisor (N = 108). As a result, the sample was divided on the basis of who the program agents perceived their primary supervisor to be.

Questionnaires were distributed to all 280 program agents employed by the extension service. Of the 221 questionnaires returned by mail, 204, or 73% of the total population, were usable.

Typically, trust has been measured either by the trusting behaviors exhibited or by self-report questionnaires. The latter approach was chosen because of the difficulties in obtaining behavioral measures in the field. Because previously designed scales did not provide trust measures for the persons of interest in the employment relationship, trust scales were specifically designed for these studies. Other trust questionnaires were examined so that the items could be framed in the conventional terms (Likert-type scales) used to measure trust (Griffin, 1967). These scales were tested in a previous study by an author. As would be predicted in the literature, the trust-in-superior and trust-in-management scales were found to have a positive significant ($p > .001$) relationship to participation in decision-making (Zand, 1972), to the success of a management-by-objectives program (Patten, 1972; Hollmann, 1976), and to job satisfaction (Driscoll, 1978). This indicates that these scales are valid measures of trust. A more detailed description of the development of these measures is published in another article by Scott (1981).

The measures in this study examined the participant's perceptions of trust toward the CED, regional supervisor, and top management as shown in Table 1. The response for the Likert-type items was strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree.

For the first three hypotheses a Pearson's correlation is the method of statistical analysis because age is treated as a continuous variable. For the fourth hypothesis, a T-test (controlling for unequal cell size) is used to determine if a difference between groups existed (i.e., those who reported to supervisors older than themselves and those who reported to supervisors who were younger than themselves).

TABLE 1
Factor Analysis Results of Trust Measures (Varimax Rotation)

CEC Trust	FACTOR NAME (ITEMS)	FACTOR I	FACTOR II	FACTOR III	h
1.	I feel free to discuss work problems with my immediate supervisor without fear of having it used against me later.	.912	.034	-.038	.835
2.	I have complete trust that my immediate supervisor will treat me fairly.	.937	.072	.003	.884
3.	If I make a mistake my supervisor is willing to "forgive and forget."	.893	.095	.053	.809
4.	My supervisor is friendly and approachable.	.893	-.023	.110	.810
5.	I can count on my immediate supervisor for help if I have difficulties with my job.	.861	.137	.089	.768
Regional Supervisor Trust					
6.	In most cases, my regional supervisor is concerned about my welfare.	.176	.841	.204	.779
7.	It is best not to confide in my regional supervisor because the information you share is likely to be used against you.	-.143	.747	.056	.582
8.	All things considered, I have trust that my regional supervisor will treat me fairly.	.185	.882	.150	.834
9.	I can rely on my regional supervisor to help me if I have difficulties getting my job done.	.094	.857	.088	.751
Management Trust					
10.	Management has little regard for the well being of people who work for this organization.	.125	.212	.793	.690
11.	At Cooperative Extension management cannot be trusted.	.083	.293	.801	.735
12.	When management must make decisions which seem to be against the best interests of the employee, I believe that management's decisions are justified by other considerations.	.012	-.091	.554	.315
13.	Management seldom follows through with what they say they are going to do.	-.014	.166	.811	.686
Eigenvalue		4.7	3.1	1.7	
Variance Explained		41.7	29.8	23.3	

Results and Discussion

Questionnaire items were designed to measure trust in CED, trust in regional supervision, and trust in management. The coefficient alphas are greater than .83 and the interscale correlations are substantially less than the coefficient alphas which, according to Nunnally (1978), indicates discriminant validity. Furthermore, the factor analysis (orthogonal rotation: varimax) is consistent with the theoretical assignment of items to scales (see Table 1). As the factor analytic results indicate, the factors emerged with an eigenvalue of greater than 1.00, explaining 96 percent of the variance. Factors I, II, and III (Trust in CED, regional supervisor, and management, respectively) all had quite high factor loadings, ranging from .594 to .893 (except for item 3 on the management trust scale). The .280 factor loading probably resulted from the complexity of the item. As a result, the item was dropped from the analysis.

TABLE 2

The Relationship Between Age and Interpersonal Trust

Age Groupings/ Trust Measures	CED N = 76	Regional Supervisor (N = 108)	Management (N = 183)
Employee Age	r = .194*	r = .042	r = .173**
Supervisor Age	r = .127	r = .27**	
Age Difference	r = -.241*	r = .070	

¹For the "r" values, * p > .05 and ** p > .01.

The first hypothesis, which predicted older respondents would have a higher level of trust than those who were younger, received mixed support (see Table 2). A significant positive relationship was found between employee age and trust in the CED ($r = .194$, $p > .05$) and trust in management ($r = .173$), ($p = .010$). This supports Anderson's (1968) and Cox's (1972) findings that adults were more

trusting than college students. However, the reason why a significant correlation was not found between trust in the regional supervisor and respondent (subordinate) age is not easily explained. Although there are differences between the role of the CED and regional supervisor as discussed, neither theory nor previous empirical findings provide an obvious reason for why these differences were found.

The second hypothesis, which predicted that younger superiors would be trusted more than older superiors, was not supported (see Table 2). In fact, a significant positive relationship between age and trust was found between the age of the respondent (subordinate) and trust in regional supervisor. Thus, research showing that older people are perceived as less capable does not seem to be related to perceptions of trust in one's superior. In fact, these findings indicate older regional supervisors are trusted more than younger ones ($r = .270$), ($p = .002$). However, again differences between the two measures were found between the trust in the regional supervisor and CED. A possible explanation for this is the daily working relationship that the CED has with the agents (respondents). Age may not be as important in determining trust as actual knowledge of the person holding the job. Since the regional supervisors work at a different location from the agents and have job duties which limit their interaction, the agents have less information upon which to base trust. As a result, age may be substituted for specific knowledge as a factor upon which trust is based. Thus, this set of findings is consistent with a theory of proximity.

The third hypothesis which predicted a positive relationship between age difference and trust in one's superior was also not found. In fact, for the trust in the CED a negative relationship between age difference and trust was found. ($r = -.241$, $p = .018$). Thus, the rationale that a subordinate would have more trust in an older superior because he/she would be less threatening is not supported. It would seem that in the case of CED, trust is higher for agents who are about the same age.

The fourth hypothesis predicted that respondents trust superiors who are older than themselves more than they will trust supervisors who are younger. In terms of the CED sample, no significant difference existed between the two groups ($X = 3.92$, respectively) was found. However, for the regional supervisor sample, a difference between the two groups was definitely significant (.001). Respondents had more trust for superiors who were older

than themselves ($X = 3.84$) than for superiors who were younger ($X = 3.27$).

In conclusion, these findings indicate that a relationship between age and trust exists. Evidence that older respondents trust management more than do younger respondents may indicate that older employees have more knowledge of those who hold top positions in management (they may have started out as peers years before) or that older employees are more trusting of someone more nearly their own age (top level management are typically older). The latter interpretation is consistent with the finding of a negative relationship between age difference and trust.

However, difference in the age/trust relationship between respondents who perceive their primary supervisor to be the CED and those who perceive their primary supervisor to be the regional supervisor is perplexing. As reported, a significant relationship was found between trust in the CED and two of the four age variables. Unfortunately, these did not correspond with the two significant relationships found between trust in regional supervisors and the age variables. It would seem that an unknown moderating variable exists which would explain these differences. Thus, one implication of this research is that age influences trust but the relationship between these variables is not clear. Further development of theory and additional empirical research is necessary. A more practical suggestion is that age has an important influence on trust and where large age differences exist special efforts should be made to build trust.

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