The Effects of Technocratic Orientation on Response to Emotive Language

Summer 1982

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THE EFFECTS OF TECHNOCRATIC ORIENTATION ON RESPONSE TO EMOTIVE LANGUAGE

BY

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B.A., Wake Forest University, 1980

THESIS

Submitted in partial fulfillment of the requirements for the Master of Arts degree in Communication in the Graduate Studies Program of the College of Arts and Sciences, University of Central Florida, Orlando, Florida.

Summer Term
1982
To Elizabeth West, my mother and my friend,
and to Bill Newnam, my friend and my mentor.
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Introduction

Human history has been a constant study of how man has interacted with his environment. The ecstasies of overcoming his natural limitation by controlling nature have until recently been the historical highlights. Such may no longer be the case. The world has changed and what has been our salvation, technology, is often no longer viewed as benevolent. The era in which we live, breathe and communicate—the twentieth century—is characterized by the ubiquity of the machine society. William Carleton (1970) observes in his exploratory essay on technology and humanism that metropolitanism and machine technology are spreading to all parts of the world. . . . The overriding contribution of the twentieth century to history is technocracy: the technicized, cybernetic, computerized society increasingly run by scientists, engineers, and technicians. This society is drastically changing man's institutions and transforming his behavior and basic values. . . . In every society, the central reality is coming to be the ubiquity of the machine, the deference for quantitative methods, and the rule of the technicians. (p.255)

Given the pervasive nature of technocracy as a social force shaping our environment, it is informative to examine the effect of technocratic society on human values, attitudes, and behaviors. One manifestation of significant societal changes is an evolution of language usage; as man responds to his environment, so his language responds and evolves. This linguistic evolution in turn helps shape man's values, integrating him into arising social
systems. The relationship between social evolution and the changing patterns of language usage is outlined by Fernando Penalosa (1981) in his introduction to the sociology of language:

It is reasonable to assume that the most fundamental, the most basic function of language is to control people's behavior. On a societal level, . . . the major function of language is social cooperation and control--promoting conformity to a society's norms. Language is a tool, a vehicle of the social order. It is a gross oversimplification either to identify language with communication, or to view its sole function as communication. In many instances it serves for the reflection, clarification, consolidation, or alteration of interpersonal relationships and sociocultural values. The major effect of language has been the creation of a system that made integration, social coordination and cooperation, as well as cultural cumulation and transmission possible. (p.38)

Because technocratic society has far-reaching influence on the formation of human values, thoughts, and communication patterns, analysis of this interaction between man and technocracy, between man and his changing social environment, is crucial to understanding the evolution of mankind in its approach to the twenty-first century. Examination of this interaction between technological society and language will incorporate establishment of a background for discussion, justification for a focus of discussion, clarification of a methodological focus, and summation of empirical results and their implications.
Background for Discussion

Technocracy

In order to discuss technocracy as a social force it is first necessary to grasp what the technocratic society is. Webster's New World Dictionary (1972) provides a foundation with which to approach understanding the concept, defining technocracy as a "government by scientists and engineers" (p.440). This simplistic definition, however, fails to encompass the broader implications of a technocratic society. As Daniel Bell (in Ferkiss, 1969) elaborated, "technology is not simply a 'machine,' but a systematic, disciplined approach to objectives, using a calculus of precision and measurement and a concept of system" (p.30). The technocracy is not merely a government by scientists, it is a strong and pervasive social force affecting an overwhelming majority of the populace.

The existence of technology, as history demonstrates, far preceded the emergence of the technocracy. The increasing dominance of scientists and engineers in controlling the directions of society arose out of the war years and the early cold war era, stemming from the increasing levels of industrial investment and centralization of decision-making, and aided in no small part by a public in awe of the marvels of science. The implications of these trends, as Simon Ramo
(1970) notes, is that science and technology force us to organize our resources and streamline our decision-making processes, which in turn presses us "without ready alternative toward a controlled, regimented social system" (p.64). In this manner the social forces of industrialization and centralization coalesced to form a powerful and pervasive technocratic value system.

Approaching full maturity as a social force, the technocracy develops as a controlling rationalistic motivation with widespread implications for a broad spectrum of human activity. Such a social force, with far-reaching influence over the thought and action of the citizenry, inevitably seeks to entrench its own value system throughout this spectrum of human conduct. With the inception of the technocracy, author and theorist Theodore Roszak (1969), who discusses the contributory factors above, argues that

... we arrive at the era of social engineering in which entrepreneurial talent broadens its province to orchestrate the total human context which surrounds the industrial complex. Politics, education, leisure, entertainment, culture as a whole, the unconscious drives, and even protest against the technocracy itself: all these become the subjects of purely technical scrutiny and purely technical manipulation. The effort is to create a new social organism whose health depends upon its capacity to keep the technological heart beating regularly. (p.7)

The values inherent in such a systematic approach transcend both political and ideological boundaries, permeating society at all levels. Roszac (1969) isolates this transnational imposition of technocratic values in The Making of a Counter Culture, noting that

... the technocracy easily eludes all traditional political categories. Indeed, it is characteristic of the technocracy to render itself ideologically invisible. Its assumptions about reality and its values become as unobtrusively pervasive
as the air we breathe. While daily political argument continues within and between the capitalistic and collectivist societies of the world, the technocracy increases and consolidates its power in both as a transpolitical phenomenon following the dictates of industrial efficiency, rationality, and necessity. 

Understanding that the technocratic society incorporates both the social absorption of technological values as well as the actual institutional structure of a "government by scientists and engineers," it is now possible to outline some of the controversy surrounding the effects of technocratic society on human interaction.

Societal response to the machinations of the technocratic system has been varied and conflicting. The variety of perspectives that have developed regarding this social force are characterized by a high degree of controversy. On the negative side, opinion is that the technological system denies our essential humanity, robbing us of our creativity and stifling our individuality. On the positive side, opinion is that technology offers mankind a chance to extend itself, to actualize itself creatively through the variety of new technological mediums that have been developed.

Those criticizing the technocratic system found their position on the inherently impersonal nature of the mechanistic institution. Joseph Camilleri (1976) remarks that "the elaborate bureaucratic technological society depends for its efficient organization on a system of anonymous or impersonal control" (p.30). Man is human, individual, creative, different; the system treats all men the same, often shaping them into categories and processes which stifle individuality and encourage rationality, efficiency, and objectivity.
The nature of man is such that he cannot endure this machine state. Gordon Taylor (1972), in his critical essay, *Rethink*, further explicates this conflict between man and the machine society, contending that the ultimate threat posed by technocratic society is the sense of insignificance that man feels in the face of technological complexity. It is technology that "is at the root of modern existential despair, the feeling that life has no meaning" (p.332). Camilleri (1976) writes that this profound disharmony between man and his creation, which enslaves him and transforms him into an object, is distinguished by political apathy, social anomie, and mental or emotional disorder which are the products of the dual process of domination and alienation to which the technological society subjects the human psyche. Thus while technology can, in and of itself, become a creative tool, the institutionalization of technocratic values and decision-making processes only serves to mute the creative spirit, creating a mechanized, inhuman social structure. The implication of this alienation and loss of meaning is dramatically outlined by Simon Ramo (1970) in *Century of Mismatch*:

The end result is that man becomes an anonymous, interchangeable cog in a nation of signals, gears, vehicles, flowing chemicals, and electric power, to the point that it is difficult to tell the man from the machine. (p.81)

In sharp contrast to this position, many theorists have observed that technology and its social implications are here to stay, and that the best interests of humanity are served by efforts to utilize this technology to sustain and extend our creativity and individuality. As Daniel Callahan (1973) points out, "the most important perception
is to understand and accept the fact that man is a technological animal. It makes no sense to talk of Homo Sapiens without technology nor to distinguish man from technology" (p. 248). Viewed from this perspective, acceptance, rather than rejection, of the technocracy offers better prospects of self-actualization. Characterizing this realistic point of view, Alvin Toffler (1972) isolates the imminent dangers of negative rejection of technology:

When [critics] plunge backward into irrationality, anti-scientific attitudes, a kind of sick nostalgia, and an exaltation of now-ness, they are not only wrong, but dangerous. . . . Their alternative to technocracy is not post-, but pre-technology. Nothing could be more dangerously maladaptive. . . . Whether we wish to prevent future shock or control population, to check pollution or defuse the arms race, we cannot permit decisions of earth-jolting importance to be taken heedlessly, witlessly, planlessly. To hang loose is to commit collective suicide. (p. 3)

The alternative to rejection, of course, is acceptance of technology and technological society as the next step in the evolution of mankind. The very real potential for technology to vastly extend man's horizons is summarized by Victor Ferkiss (1969) as the concept of "technological man" emerging like a seed beneath the snow, whereby "the existential revolution can become an instrument for liberation rather than destruction" (p. 271). Samuel Florman (1981), engineer and outspoken theorist on technology, maintains that technology is to a large degree still under human control, still guided by the human spirit. Because this is so, society as a whole must mature, lose its illusions about what technology can and cannot do, and press ahead with this awareness to realize our constantly changing vision of a more satisfactory society.

These differing opinions serve to clarify some of the controversy
over the effect of the technocratic system on human values. From one perspective, if technological systems are not rejected, individuals lose their unique identity, are subjected to emotional and creative suppression by the robot society, and experience a technocratic transformation of value structures, causing them to view and relate to other humans as objects, engaging in machine interaction. From the opposite perspective, man has to accept technology as an extension of self, to utilize technology to maximize pragmatic and aesthetic benefits, to realize that abject pessimism is fruitless, and that his freedom and survival ultimately rest with technology.

Here, then, is the technocracy: an efficient, disciplined, systematic social force, conceived in the wartime era of industrial investment and centralized decision-making, developing as a controlling, self-perpetuating social order transcending political and ideological boundaries, socializing its human components into a value structure emphasizing efficiency, rationality, and objectivity, characterized by a high degree of controversy over its effects on humankind.

Language

Shifting perspectives for a moment, the question of linguistic development and analysis will be addressed in three areas: the concept of language as a model for mind, a reflection of the evolution of culture and thought; the concept of emotive language, an expression of emotions through linguistic structures; and the concept of task instruction, a linguistic orientation to problem-solving behavior.
While the first describes a general relationship between language and thought, the second represents a specific manifestation of this general relationship, concentrating on the expression of emotional thoughts and feeling through the structures of language. The third concept, as a pragmatic operationalization of orientation by language, is a concrete manifestation of linguistic interaction.

The first concept, that of language as a model for mind, has been a focus of controversy for some time. The main point in contention has been the question of whether language acts to bind our perspective in our outlook on the world. Most theorists would agree with Fox (1979) that "conceptual thought and language, inhibitions by obedience to rules, emotional responses to objects of social and environmental classification, all developed together" (p.152). The idea that language and culture affect each other through the evolution of conceptual thought seems very reasonable. Penalosa (1981) writes that it is quite logical to make a basic assumption that language and society influence and determine each other. Relying on this assumption, language functions as what Thass-Thienemann (1973) refers to as a "vehicle of continuity." Language, through its influence on thought and its reflection of sociocultural changes, becomes our heritage from previous generations.

To say that there is an interaction between language and thought, however, is not to say that language determines and forms the boundary for thought. This extreme position was advocated by Benjamin Whorf in the late 1930's and made popular as the "Sapir-Whorf Hypothesis." To oversimplify it a little bit, an advocate of this position will
argue that linguistic categories are acquired first and determine what cognitive categories are acquired; that our language determines the boundaries of our reality. Foss and Hakes (1978), reviewing theories of linguistic determinism, point out that no strong evidence exists in favor of the strong version of the hypothesis. One example cited to disprove the strong versions of the Sapir-Whorf hypothesis is the relatively stable perception of color groups across cultures with totally different linguistic structures. They explain that in the realm of color, at least, there appear to be some basic constraints that limit the way in which this aspect of our experience is coded in the language. This means that language is more a reflection than a cause of basic cognitive and perceptual categories. This conclusion is, of course, directly contrary to Whorf's hypotheses. (p.390)

What they point out as more likely being true is a weak version of the hypothesis. Under this theory, linguistic structures provided by language can have an important influence on thought processes but they do not determine all such processes. Bloom (1979) lends credence to this version, suggesting that an individual's understanding of, thoughts about, and reactions to the world are largely a function of the way that individual cognitively segments the world into distinct categories or schemas and . . . while the individual constructs many of the categorical foundations of his/her thinking independent of the influence of language, he constructs many others to fit the parameters of his language, in order to understand and mean by his linguistic labels what other speakers of his language understand and mean by theirs. (p.585)

In short, while we may have many categories or concepts in our minds that function independent of linguistic structures, we also have many that do function through language. Penalosa (1981) writes that the child is an active participant in the learning process, to the point
that children often develop their own secret language. This language can develop in conjunction with their own social structures, norms, concepts, and boundary mechanisms. To this extent, linguistic structures that arise in response to societal changes may not fully determine what structures, or what categories, arise in the minds of developing children, but there is still a significant relationship between the linguistic structures and the development of cultural and linguistic perspective. As Penalosa (1981) concludes:

In socialization, the child not only acquires language within the social structures and through its mediation but also internalizes social reality by means of language, thus shaping both consciousness and personality structures. ... The available linguistic repertoires are transmitted to the child by such specific structures as institutionalized kinship systems, age groups, and educational institutions. (p.42)

Here, then, is the concept of language as model for mind: developing concurrently with the evolution of conceptual thought, shaping thought but also being shaped, transmitting aspects of social reality through both interpersonal relations and social and educational institutions.

The second concept, that of emotive language, reflects the emotional, subjective aspect of language usage. Ogden and Richards (1946), in their seminal work The Meaning of Meaning, differentiate between the symbolic use of words and the emotive use of words. The symbolic use of words is simply statement: the recording, support, organization and communication of references. The emotive use of words includes both the expression of emotions, attitudes, moods, intentions, etc., by the speaker, and their communication, or their evocation, in the listener. According to Ogden and Richards (1946), two ways the linguist can concern himself with the affective side
of language are apparent: first in its effect on the order of the words, and second in its determination of the vocabulary. More recently, Thass-Thienemann (1973) differentiates between human perception of the "sign meaning" of a word, the express definition, and the symbolic connotations of a word, or the "emotional elements evoking unconscious fantasies that have been repressed and eliminated from the manifest surface of language" (p.10). Szalay and Deese (1978) have developed the concept of "psychological meaning," by which they refer to "a person's subjective perception and affective reactions to segments of language" (p.2). From a purely theoretical perspective, then, emotive language can be summarized as an expression of the emotions of the speaker, and a reflection of emotional elements that are not apparent in the surface meaning of language. Miller and Johnson-Laird (1976) conclude that "much of our speech expresses or inspires emotions; a complete account of the psychological foundations of language would have to treat [the construct] FEEL in considerable detail" (p.112).

Empirical research on this theoretical construct of emotive language is far from plentiful. Boucher and Osgood (1969) developed the "Pollyanna Hypothesis," referring to "a universal tendency to use evaluatively positive words more frequently, diversely, and facilely than evaluatively negative words" (p.2). Their research on high school students showed that in responding to a hundred common culture words, evaluatively positive words were used significantly more. Eiser and White (1973) had children rate nonsense names on two-category scales to estimate the character the names
conveyed. They too found that grammatically affirmative descriptions were applied more frequently than grammatically negative descriptions. Hoosain (1977), investigating the nonverbal realm, found that in responding to perceptual or linguistic signs, subjects responded significantly quicker to signs with positive affective meaning. Thus usage of and response to positive affective symbols seems greater than for negative affective symbols. Interestingly, in light of these findings, Paivio (1968) found that relatively unemotional words were recalled better than those that were rated higher in emotionality. We may respond better to positive symbols, but we remember non-emotional symbols.

While there seem to be definite implications of emotive language in terms of perceptual and cognitive patterns, the area has experienced scanty research and very little application as yet. Miller and Johnson-Laird (1976) conclude that "studies of the use of language to describe emotions exist, but not an adequate account of the semantics of emotional terms or an adequate theory of human emotions" (p.670). In sum, the concept of emotive language is developed theoretically as a distinction between the sign meaning of words and the expression of emotion through symbolic connotations, expressed as a key determinant of psychological meaning, and empirically validated as affecting both perception of and response to verbal and nonverbal communication.

The third concept, task instruction, as a more specific area of language usage, is useful for research on response to language. The general importance of orientation or instruction is obvious: the
type of instruction, or the manner in which an individual is oriented towards a task, will affect the individual's perception of and response to that task. In a study of children's responses to color, shade and form, Adler (1977) found that shifting concepts in various dimensions is facilitated by an orienting procedure during training and testing. Field and Collins (1977), comparing objective and projective instructions, found that constancy of shape judgements was reduced significantly using projective instructions.

One notable area of research in this field concerns the contrast between skill and chance instruction; skill instructions emphasize that the task requires skill, chance instructions emphasize that the task depends on luck. This comparison is often made in conjunction with a comparison of locus of control; subjects with an internal locus of control believe that they can control events in their life, subjects with an external locus of control believe that they cannot control such events. This locus of control should interact with the type of instruction (skill or chance) in shaping an expectation of success at a task. Brice and Sassenrath (1978) found such a significant interaction, establishing that subjects with an external locus of control given chance instructions had an almost equal expectancy of success as subjects with an internal locus of control given skill instructions, and that these levels of expectancy were significantly lower when instructions were switched for the groups. This was found to be true only if subjects believed the instructions. The importance of credibility of test instructions and the resultant responses to such test instructions by the oriented subjects has been verified.
by other research. Hart and Libb (1977) found that subjects with an internal locus of control responded faster and solved more anagrams correctly when given chance instructions than when given skill instructions; yet when the credibility of the instructions was taken into account, the credibility as perceived by the subjects, significant differences existed only for those who disbelieved the instructions. Seemingly contradictory results can thus be explained by the response of subjects to the instructions for the task. Instructions seem to offer a means of examining the effects of language usage on subject response to variations in such language usage. Yet research done on task orientation has focused on the type of instructions (skill versus chance; objective versus projective) and has failed to examine the potential for transmission of affect, or emotive language, through task instructions. Based on the importance of affect in language and the fact that task instructions definitely alter responses to various concepts, it would seem appropriate to examine the use of affect in transmitting information and motivating responses to a task.

Technocracy and Language

A final area to consider before an empirical approach is justified concerns the intersection of research on technology and research on language: the increasing relevance of technological society in the evolution of the human communication system. A widespread communication revolution has already begun with the explosion of computer training and usage in schools and homes across the nation. Sally Reed (1982) reports in the New York Times' Spring Survey of Education
that the flirtation with technology that began roughly four years ago for a few of the nation's schools has quickly blossomed into a passionate romance for half the public-school districts in the country. Seemingly overnight, teachers in all grades now use electronically programmed instruction. According to recent surveys, there were 52,000 computers available to students for educational purposes in 1980, and 40,000 more made their way into schools last year. The latter figure is expected to increase by 300 percent in the next three years. (p.37)

Technology is becoming more and more a part of the socialization process, pervading both the home and the educational environment. Dina Ingber (1981) estimates, conservatively, that one out of three American homes will have computers or computer terminals within the next five to ten years.

The implications of this massive influx of high technology into the socialization process are only beginning to be grasped. Karen Sheingold (1982), reviewing the utilization of computers in three different school systems, found little if any research on the effects on children of computer-assisted instruction. Many of the extreme effects of computer usage are showing up in college students who become computer addicts, or "hackers." Hackers become so wrapped up in the computer world that they often lose touch with reality, and forsake human interaction, sleep, and sometimes even food to dwell in the awesome complexity, rationality and power of the machine. Because of the rising use of computers, and the resultant information explosion that has descended upon modern society, Ingber (1981) argues that "the case of the hackers is not just the story of one person's relationship with a machine. It is the story of society's relationship to the so-called thinking machines, which are becoming almost ubiqui-
This escalating importance of computer technology represents the increasing relevance of technocratic society in shaping human communication patterns: as society evolves into more and more complex patterns which stimulate more and more complex technologies to evaluate them, human interaction with these technologies will increasingly affect the development of thought patterns and the formulation of linguistic structures to transmit these patterns.

If, as Ramo (1970) argues, man eventually becomes a cog in the machine of technocratic society, then the interaction that occurs with other cogs in the machine are governed by the context of the machine. Peter Berger (1973) explains the effect of this technological value system in the context of social relationships, noting that

... modern technological production brings about an anonymity in the area of social relations. ... Componentiality, which is intrinsically related to the manner in which modern technology deals with material objects, is transferred to individual relations with others, and ultimately with the self. This anonymity carries with it a constant threat of anomie. The individual is threatened not only by meaninglessness in the world of his work, but also by the loss of meaning in wide sectors of his relations with other people. (p.183)

Much of this interaction with other human beings is both governed and reflected by the linguistic structures which we develop as we become socialized into modern society. Any process which inculcates objectivity in human relationships and shifts emphasis from humanistic values to efficient, rational values will necessarily affect human communication patterns. The contribution of the ideology of the technocracy to the fragmentation of social processes and hence to the
subjugation of individuality within these processes was isolated by Carolyn Miller (1978):

The ideological context of technology contributes to what has been called the fragmentation of our culture and thus to the difficulty of making social decisions through rhetorical processes. . . . If we believe that our relationship with the world is objective, that the external word determines our knowledge of it, then the concept of ethos evaporates—there can be no character to our knowledge or action, other than the idiosyncratic or the mistaken. That loss is the most rhetorically powerful consequence of technology. (p.234)

Yet the specific effects of technocratic society on socio-linguistic evolution remain unclear. An unfortunate aspect of the current study of language is the lack of concentration on social realities. While we have studied language in terms of structure, and in terms of linguistic evolution, we have not extended linguistic analysis to include the full scope of sociological evolution. The possible reflections of objectivity and rationality in the use of and response to subjective linguistic processes such as emotive language have yet to be singled out. The considerable degree of neglect apparent in the field of linguistic analysis is outlined by Penalosa (1981):

Traditionally, sociologists have concentrated on abstract social relations to the neglect of the political and economic aspects of society. To a considerable extent, this tendency is also manifested in much work in sociolinguistics and the sociology of language. This is particularly true of those who emphasize a microsociolinguistic focus in their work. Such work tends to focus on the formal aspects and to ignore the political and economic realities of broader society. (p.37)

The interaction between technocratic society and linguistic evolution, while of mounting importance in the realm of human communication, has to a large degree been ignored by sociolinguistic analysts.

In sum, there exists today in society a tremendous social force
identified as the technocracy. While this social force clearly has significant controversial implications for the evolution of linguistic structures, and thus for the interaction between individuals, its effects on emotive language, on value structures, and on linguistic patterns has been neglected. Having established a foundation for discussion, it now becomes possible to offer justification for a methodological focus.
On its face, further experiment is justified to expand our knowledge in an area neglected by communication and cultural analysts. Much research has been done on sociocultural evolution of language, including both linguistic structures and emotive qualities. Likewise, much research has been conducted on the inception, development, and implications of the technocracy. The merging of these two fields, however, remains to be seriously considered. Further study is therefore justified, if only to cross apply two vital areas of sociological analysis and thereby expand our knowledge. The questions broached by the study are rather clearcut. Are human value systems shifted by exposure and acclimatization to advanced technologies? Are such changes transmitted through a linguistic evolution which exhibits individual preference for rationality and impersonality in communicating with others? Does technical training (such as computer experts undergo) affect the way humans respond to other humans? Such are the issues as developed in the background discussion. The study, in essence, seeks to apply differing qualities of emotive language (very cold, efficient, impersonal usage versus very warm, friendly and personal usage) to groups with differing levels of technical training. In attempting to answer the above questions, the study synthesizes the
concepts involved in the sociocultural evolution of language and the concepts involved in the increasingly technical nature of society and its implications for human value systems. Viewed from the framework of scientific endeavor, the experiment is justified as an effort to relate two important fields of study whose intersection has as yet been largely ignored.

At a societal level, the seriousness of technocracy as a social force justifies the application of linguistic analysis. Given the tremendous upsurge in computer usage throughout the educational system, society has a significant interest in a thorough evaluation of the effects of computer training and usage on human development. Because the technological condition has become so crucial an issue, we cannot afford to ignore it. The potential consequences of either acceptance or rejection of technology without an adequate consideration of the implications involved are significant both quantitatively and qualitatively; quantitatively because of the enormous destructive and constructive potential of technological developments, qualitatively because of the potential effects the technocratic system has on the human psyche.

Whether or not any of the various contrasting views of man and his evolving environment are true, what is essential is that we develop and apply optimal methods of analyzing these contrasting views. Wallia (1970) clarifies the societal importance of research in this area when he observes in his compilation of essays Toward Century Twenty-one that
... an open exploration of the shifting image of man and his values as he views himself and--by the same act of observation--views the biosphere and cosmos is necessary if man is to avert total catastrophe, nuclear or otherwise. (p.3)

Whether we see the technocracy as the elimination of human creativity and meaning, or as the mechanism with the potential for actualizing mankind, we must seek both to expand our knowledge of modern society and its effects and to retain our flexibility in grasping the nature of the conflict between the individual and his society. An empirical examination of the effects of technocratic training on language development and usage would both expand our knowledge and provide an additional tool for insight into the effects of our evolving technological society.

Aside from this societal justification, the study is personally justified. Technocratic training and possible value inculcation is a very important factor both in my relationship to others and in my evaluation of myself. I live in a highly complex technical society in which I am constantly interacting with high technology and have become almost wholly dependent on the technological system. I have taken computer courses and have a number of friends trained in computer programming, some even with their own personal computers. I already have devoted and probably will devote a significant number of years involved with and supporting educational institutions which are an integral part of the socialization process. Since I function and survive in a technically oriented society augmented by such institutions, I feel that I cannot afford to ignore its implications. If I can cast but a little bit of light, then it will all be worth it.
Regarding possible bias that results from my involvement with the issue, while I hope to exhibit scientific objectivity in studying this evolution of language in our technocratic society, I will not (cannot) divorce myself from the conflict at hand. I question the desirability of extreme objectivity in a situation where my understanding and my grasp of this vital conflict perhaps rely on my ability to subjectively evaluate my own feelings about the technocracy I live in and the communications I make within it. The point being made is clear: while I basically strive for objectivity, I must, of necessity, reflect the biases and attitudes ingrained by various aspects of the social system. These biases, hopefully, contribute more to the understanding of the critic and his audience than they do to the skewedness of the critic's approach.

In the final analysis, my goal is to contribute, if only slightly, to the understanding of human behavior; its motivations, its methods, and possibly for its implications regarding the future of man on this planet. Thus the general justification for a methodological focus is an attempt to broaden our perspective regarding technocratic society.
Methodological Focus

We have come to grips with some of the aspects of both technocratic society and language development and usage, and it is apparent that a methodological approach merging these aspects is justified at scientific, societal, and personal levels. To approach a greater understanding of the controversy over the effects of technological society on the human communication system, the study has two objectives: (1) to evaluate the response of high and low technically oriented individuals to emotive and non-emotive test instructions, and (2) to lay a foundation for future more extensive efforts to expand knowledge in this area. This pragmatic methodological focus will address four areas: hypothesis generation, variable manipulation, variable measurement, and procedural enactment.

Hypotheses

Faced with a rather heated controversy over whether the technological condition has depersonalized or actualized human individuality, it makes no sense to suspect that one position or the other is absolutely true. It is unlikely that high-level technically trained individuals will respond better to cold orientation than warm orientation, since their training is but one of many factors affecting a cognitive system (and a value hierarchy) already reasonably well
established by the time of entrance into college. Yet it is equally unlikely that an intense training in technical terms and logical linguistic structures will have no effect on the individuals cognitive and linguistic systems. Constant interaction in a dry, structured technical mode of communication should have some effect on the regular mode of communication, interaction in ordinary English. To say that one mode will not affect the other is as ludicrous as saying that one mode will entirely dominate the other; the middle ground must be inspected. With this in mind, the following two hypotheses were generated, based on the reasons provided.

**Hypothesis 1.** Warm message orientation will be responded to significantly better than cold message orientation overall. The rationale for this hypothesis is that high technology majors such as computer science and engineering are not really pursued by cold people, they are just actualizing themselves through different majors, different fields of study. One of the communication links used is technical and objective in nature, but as only one of the links, it does not absorb and dominate all of the self. These people are not inhuman, machinelike entities, they are humans, still appreciative of warmth and consideration in interpersonal relations. Hence the warm message orientation will be responded to better by all involved, both technical and non-technical.

**Hypothesis 2.** Individuals with high-level technical training will respond significantly better to cold message orientation than those with low-level technical training. The rationale for this hypothesis is that training in logical, efficient and scientific
language structures will have some effect on other modes of interaction such as the use of emotive language in interpersonal communication. The objectivity of perspective instilled is probably not enough to induce preference for the cold orientation over the warm orientation, but it should exhibit enough force to highlight a difference between regular fine arts education (such as communication majors undergo) and high-level technical training (such as computer science majors undergo) in shaping responses to a cold orientation. Students with computer language training should be more accustomed to and find it easier to function in and respond to the cold, efficient, impersonal and objective linguistic structures.

Variables Manipulated

Two independent variables were operationalized: level of technical training and warmth of the orienting message. Discussion of each variable includes both rationale for manipulation and actual operationalization.

The rationale for manipulation of the first variable, the level of technical training, was based on the need for an evaluation of the effect technocratic society has on human development. The clearest way to broach the controversy over the effects technical training has on human cognition and interaction is to differentiate between individuals trained in very technical fields and those trained in less technical and more traditional fields. This was carried out, or operationalized, through a comparison of upper level students of computer science and upper level students of communication. Both
groups are, in many senses, students of language. One emphasizes logic, rationality, process, structure, and machine interaction, while the other emphasizes theory, creativity, expressiveness, and human interaction. This choice of classes, computer science and communication, thus operationalized the distinction between high and low levels of technical training.

The rationale for manipulation of the second variable, the warmth of the orienting message, was based on the potential for technical acclimatization to objectify our perspective on life and impersonalize our relationships with other humans. Szalay and Deese's (1978) concept of "psychological meaning," the subjective perception and affective reaction to segments of language, is pertinent here in that it draws the connection between an individual's state of mind, the action of both cognitive and emotional systems, and reaction to various aspects of language. If, as Berger (1973) maintains, the technological system threatens the individual with componentiality, objectivity and meaninglessness in relations with other people, then a primary reflection of this state of mind will be an individual preference for objectivity, rationality and impersonality in communicating with others. Manipulating the warmth of the orienting instructions should establish whether or not subjects prefer a warm, personal communication or a cold, impersonal communication.

Operationalizing the distinction between warm and cold message orientation is of course the key to the experiment. The message itself, in this case a task for the subject to complete and rate,
is therefore less relevant than the orientation. The entire message administered included the following in order: an introduction to the task as a graduate student effort to be evaluated by the subject; either a cold or a warm orientation to the task, depending on the condition; the task, a fifteen question test of vocabulary, logical thinking and reasoning extracted from the *Mensa Genius Quiz Book* (Grosswirth & Salny, 1981); either a cold or a warm orientation to the dependent measures, depending again on the condition; the dependent measures; and finally some requests for additional information, concluding the message. The task was selected both because it provided a cover story to have the students evaluate a graduate student's effort and because it is neither technically nor linguistically oriented; it is a mixture of both and should therefore not unduly affect one group or the other (see Appendix B).

The construction of cold and warm orienting messages was accomplished through outlining the basic information required in the orientation, delineating the distinction between cold and warm attributes, and applying these basic attributes in constructing sentences to present the basic information. The basic bits of information required in the introduction to the task are as follows: "answer the questions," "directions are clear, follow them," "the questions are hard," "respond quickly," and "ask the graduate student any questions." The basic bits of information required in the introduction to the dependent measures (after the task) are as follows: "rate the test," "rate the author of the test," "respond with initial feelings," "respond quickly," and "be honest." These
bits of information were "dressed up" with the attributes of cold and warm messages. Cold message attributes, as theorized by this researcher, are (1) the use of commanding, imperious statements; (2) the use of impersonal language, excluding "I," "me," "you," and "your"; (3) no recognition of the possibility of human error or confusion, excluding statements such as "try to," and "if you can"; (4) a preference for efficiency, whereby excess words and phrases such as "very" and "as much as possible" are eliminated; and finally (5) a lack of empathy, characterized by a lack of reference to feelings and problems the receiver might have. Warm message attributes, in direct contrast, are (1) the use of requests, a solicitous tone characterized by the use of "please" and restraint from commands; (2) the use of personal language, references such as "I," "me," "you," and "your"; (3) a recognition of the possibility of human error and confusion by the use of statements like "try to" and "if you can"; (4) a preference for wordiness, not as much an overabundance of words as an avoidance of short, clipped sentences; and (5) the presence of empathy, exhibited by reference to feelings and problems the receiver might have. By applying these attributes to the bits of information isolated above, several warm and cold orienting messages were constructed.

Confirmation of the warm and cold nature of these messages occurred through a pretest. Members of two basic speech classes were asked to respond to several similar statements using seven-point scales along the bipolar dimensions of feeling/unfeeling, cold/warm, and personal/impersonal (see Appendix A). The highest and the lowest
means on each side of the neutral point on the scale (which was 4) were utilized. The data for this pretest are discussed in the section on procedure.

**Variables Measured**

Nine dependent measures were taken; eight were efforts to rate the response of the subjects to the test and to the author of the test (see Appendix C). All except for task performance used a seven-interval semantic differential to measure the response of the subjects to the task. The rationale behind measuring response to the test and its author is simple: if technical training does affect response to emotive language, then this response should color the response to all material oriented by such language and should extend and color responses to the source of such language. The semantic differential allows us to evaluate how colored this response is by providing seven different ratings between bipolar adjectives. While by no means perfect, it provides us with at least a rough estimate of subject response.

The first dependent measure, task performance, unlike all the others, was a sixteen-point scale (no questions right to all fifteen right). It has no overwhelming importance in this study, as the response to the task, rather than performance on the task, is what is crucial to evaluate the hypotheses. The second variable was task difficulty, evaluated, as are all the rest of the variables, along a seven-point scale between bipolar adjectives, in this case, "difficult/easy." The third variable was task effectiveness, a rating of
"effective/ineffective" which asks whether the task was an adequate short test of vocabulary, reasoning and logic. The fourth variable was task evaluation, or the response of the subject to the test along a continuum of "good/bad." The fifth variable was task enjoyment, rating the test "enjoyable/unenjoyable" along the seven-point scale. The sixth variable, shifting to the author, was whether he is knowledgeable (knows what he is trying to test) or ignorant (does not know what he is trying to test). The seventh variable was simply the evaluation of the degree of effectiveness the author possesses as a communicator. These last two variables, like variables number two and three above (task difficulty and effectiveness), were in keeping with the cover story of a critical assessment of a test compiled by a graduate student. The eighth variable, the degree of pleasantness exhibited by the author, was again a key indicator of subject response to the author. The final variable, an evaluation of how cold or warm the written instructions seem, served as a manipulation check on the effectiveness of the operationalization and pretest.

In sum, the dependent measures sought were (1) task performance, (2) task difficulty, (3) task effectiveness, (4) task evaluation, (5) task enjoyment, (6) author knowledge, (7) author communication effectiveness, (8) author pleasantness, and (9) message warmth. The key variables for the purpose of verifying or denying the hypotheses were task evaluation, task enjoyment, and author pleasantness. At the end of the dependent measures, some additional information was requested: the subject's major; the number of years in the major; if the subject had taken computer science classes or worked with
computers; if so, how many computer languages were they familiar with; and how technical had their education been.

Procedure

Pretest. Ten warm and cold messages were developed by "dressing up" the basic bits of information required with either warm or cold attributes. Two basic speech classes (N=44) responded to these messages along the bipolar dimensions of feeling/unfeeling, cold/warm, and personal/impersonal. Among the five messages introducing the task, the coldest and the warmest (with respective means of 5.77 and 2.5 along a seven-point cold/warm scale) were found to differ significantly, $t_{(86)} = 11.02, p < .0025$. Among five messages introducing the dependent measures, the two extreme means along the cold/warm continuum were 5.5 and 2.61; these means differed significantly also, $t_{(86)} = 8.89, p < .0025$. These messages—numbers 3 and 8 on the pretest combined for the warm condition, and numbers 4 and 9 on the pretest combined for the cold condition (see Appendix A)—were then used in the experiment to introduce the subjects to the task and the dependent measures. In this manner, messages constructed according to the attributes associated with cold and warm communication were confirmed prior to experimental usage.

Experiment. First, upper level computer science and communication classes were administered the entire message (including cold/warm orientation to the task, task, cold/warm orientation to dependent measures, dependent measures, and requests for additional information); the cold and warm oriented tasks were mixed and randomly distributed
within the classes. The initial verbal instructions were standardized for all classes and were kept very brief: "I am a graduate student doing my thesis. Take this short test and rate it. It is very important to read the instructions carefully. The questions are from the Mensa organization, the top two percent of the IQ range. The test should not take longer than fifteen minutes. Follow the instructions and I have answers up here after you have finished it and turned it in."

Second, after the tests were all collected, the classes were contacted again for "debriefing" on what the true purpose and relevance of the test was. This was done through the instructor, to minimize disruption of the class.

Third, the additional information requested was utilized to sharpen, or clarify, the manipulation of high and low-level technical training by screening out unacceptable subjects. The remaining high-level technical subjects (N=39) all had two or more years in the computer science major. Those with only two years in the major were familiar with three or more computer languages and rated their education as either technical or very technical. The remaining low-level technical subjects (N=54) had either no training or only one class in computer science. Those subjects having one class of computer programming were not familiar with more than one computer language, and rated their education as either non-technical or very non-technical. As a result of exclusions based on these criteria, the total number of subjects used for statistical evaluation was 93, with 48 being exposed to the cold orientation, and 45 to the warm orientation.
Finally, the data were analyzed in a 2 X 2 analysis of variance for each of the nine dependent measures. This procedure resulted in a clear comparison of the effects of variable manipulation on each of the variables measured, and thus allowed a test of the hypotheses. This procedure also provided, of course, a basis for outlining results and drawing implications from the chosen methodological focus.
Results and Implications

While several significant effects were found, their presence was not sufficient to verify the hypotheses. The manipulation check on the operationalization of cold and warm written instructions revealed a significant main effect for cold versus warm conditions, $F(1, 86) = 6.86, p < .05$. This confirmed that the written instructions used to orient the subjects to the task did indeed reflect extremes of warmth and coldness. Two other dependent variables varied significantly in response to the independent variable manipulation. Task enjoyment was significantly greater for subjects with high-level technical training than for those with low-level technical training, $F(1, 89) = 4.85, p < .05$. The subjects' rating of the effectiveness of the task varied significantly in response to both independent variables. Those with low-level training rated the test as significantly less effective as a short test of vocabulary, reasoning and logic than subjects with high-level technical training, $F(1, 88) = 8.69, p < .005$. The tasks introduced by cold orientation were rated as significantly less effective than those introduced by warm orientation, $F(1, 88) = 5.22, p < .05$. There was a significant interaction between the independent variables, $F(1, 88) = 13.24, p < .001$; the mean effectiveness ratings show that subjects with high-level technical
training rated the cold oriented task as most effective, while those with low-level technical training rated the cold oriented task as least effective. No other significant effects or interactions were found.

Since none of the key variables (test evaluation, test enjoyment, and author pleasantness) exhibited significant differences in response to the manipulation of cold and warm orienting messages, both hypothesis 1 and hypothesis 2 remain unconfirmed. The significant interaction achieved on the rating of the effectiveness of the test cannot be claimed as supporting either hypothesis. Such a claim is unwarranted in light of the lack of significant differences across the rest of the key dependent measures. Two explanations seem possible for the significant effects and interactions obtained on the rating of task effectiveness: that the results were due to chance, which seems likely given no other indications of significance; or that the measure of effectiveness in this study represented the best means of evaluating subject response to the test, rather than the possibly confusing and non-relevant scales of Good/Bad, Enjoyable/Unenjoyable and Pleasant/Unpleasant.

It seems reasonable that high and low levels of technical training, interacting with either cold or warm orientation, might not affect how good or how enjoyable the task is perceived, but how effective, or efficient that task is rated. The value structure of the technocracy, emphasizing efficiency and rationality, may not permeate man's entire spectrum of activity and overwhelm his emotional response; it may instead find its reflection in his differing levels
of perception of efficiency and rationality. That the technocracy would significantly affect the realm of logic without permeating the realm of emotion might explain why a measure of effectiveness reveals significant differences between high and low-level technically trained individuals in responding to cold and warm messages while other affective measures such as author pleasantness or task enjoyment do not reflect any such significant differences in response to emotive orientation.

While it is possible that this measure is a better measure of subject response to the test, the complete lack of any confirming trends in any of the other variables mitigates this possibility. Even though some significant effects were present in the statistical analysis, the only conclusion that can be drawn from this study is that cold and warm orientation had no effect on the responses of either high or low-level technically trained individuals to the oriented task.

Based on this conclusion, several implications arise concerning those theories posited in the background discussion. The conclusion of Roszac (1969) that the total human context becomes subject to purely technical scrutiny and manipulation does not find confirmation in this methodological focus. If we accept the premise that language follows human development, which again seems a logical assumption, then the social force known as the technocracy, with its concomitant values of efficiency, rationality and necessity, does not unobtrusively pervade all of human endeavor. It is indisputable that man-machine interaction is increasing, given the upsurge of computer usage across
the nation. Yet this research casts doubt on the conclusion that this interaction robs the individual of his or her creativity, individuality and humanness. While we may undergo greater exposure to machines and machine techniques, we are not inculcated to the point where we lose our essential humanity.

Camilleri's (1976) argument that technology enslaves man and transforms him into an object finds no support in the linguistic reflections of cultural acclimatization. Those individuals with a high degree of exposure to technical training do not prefer objectivity, efficiency and impersonality in communicating with others; neither do they exhibit a greater preference for such communication in comparison to individuals with a much lesser degree of technical acclimatization. Contrary to what Ramo (1970) dramatically outlines, man has not become an "interchangeable cog in a nation of signals, gears, vehicles, flowing chemicals, and electric power" (p.81).

Our language is a "vehicle of continuity," and that vehicle, as established by this research, does not display a shift to impersonal, objective language usage. Thus the controversy over the dehumanizing effects of technological society is clarified to a degree by an examination of current linguistic preferences: the technological condition, as exemplified by a high level of computer training and man-machine interaction, does not result in impersonal and dehumanized communication patterns. To answer the questions raised in the justification for a methodological focus, human value systems do not seem to be subjugated to advanced technologies; and if such a subjugation occurs, it is not reflected as a preference
for rationality and impersonality in communicating with others.

It is possible, however, that methodological flaws or shortcomings in the current study were responsible for a lack of predicted results. One assumption made was that the technocracy would affect man's entire state of mind, including both cognitive and emotional aspects. Since the effectiveness ratings—a rational evaluation—did support hypothesis 2 (high-level respond better than low-level to cold orientation), and the other affective measures showed no such support, research to evaluate the differing impact of technological society on different realms of the human mind seems warranted.

Another assumption made was that the college environment provided an adequate comparison of high and low levels of technical training. It may be that computer science majors are not subjected to technological methods and techniques significantly more than their low-level technically trained peers. This would, of course, make such a comparison as was conducted here entirely specious as it would not truly reflect high and low levels of inculcation into technological society. One possible methodological approach would be to compare long-standing technical and non-technical academic subject populations. If high-level engineers or scientists with several years of exposure to complex technology were compared to non-technical scholars, a clearer distinction might be drawn between high and low technological acclimatization. Another possibility that would broach several other issues as well as the suitability of a college population would be a longitudinal study of the socialization process concentrating on technological acclimatization. By studying children over a period of
some time, and measuring linguistic responses as they develop and move into either high or low-level technical fields, much information could be gained concerning both the development of affect in language and the effect on such development of increasing orientation towards technical society.

A third assumption made was that the differences in affect induced by training in logical linguistic structures would be manifested in responses to written instructions. Since it may well be that affect is much more unlikely to surface in written instructions to a test than in verbal instructions, it is possible that the lack of results stems from an inadequate manipulation of emotive language. The contrast between written, verbal, and nonverbal communication of affect could be investigated as successively increasing levels of effective emotional interaction. The same concept of cold and warm attributes "dressing up" basic bits of information and pretested for significant differences could be applied to develop written, audio, and video instructions to a test. Such an experiment would provide information as to the strength of emotion communicated and its effect on high and low-level technically trained subjects.

A final assumption made was that the affect communicated by the cold or warm orienting messages would alter the responses to the test. First, it is possible that only two orienting messages—at the beginning and before the dependent measures—did not adequately orient the emotive quality as responded to by the subjects. Second, it is possible that the very nature of the oriented message—a vocabulary and reasoning test—was such that all subject responses
were not colored by the emotive or non-emotive orientation. The first problem could be approached through a continuous reinforcement of either cold or warm orientation throughout the task, the second could be approached through selection of subject material that was either not a task or was an unfamiliar task.

The response of high and low technically oriented individuals to emotive and non-emotive messages has been evaluated and no significant effects of a level necessary to confirm the hypotheses generated have been found. Perhaps the key implication has been a broadening of perspective regarding technocratic society; the field of communication has a large potential for evaluating the effects of the technological condition on human thoughts, values, and communication patterns. Research of this nature, concentrating on the effects of technocracy, will become especially pertinent as the computer explosion penetrates more and more areas of society. The "computer generation," representing as it does a step in the evolution of mankind, merits greater attention by natural scientists, social scientists, and non-empirical scholars alike; each contribute an increasingly valuable perspective on the nature of reality in our technological society as it approaches century twenty-one.
Appendix A

Pretest of Cold and Warm Messages

Please register your impressions of the following statements. The scale is 1-7, with 1 and 7 being extreme ratings, and 4 being neutral.

1. Answer these questions. Directions are straightforward—be sure to follow them. The questions are difficult, but answer quickly and move on. Any questions raised will be answered.

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<tr>
<th>Feeling</th>
<th>Warm</th>
<th>Personal</th>
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<tbody>
<tr>
<td>1 2 3 4 5 6 7</td>
<td>1 2 3 4 5 6 7</td>
<td>1 2 3 4 5 6 7</td>
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   Unfeeling | Cold | Impersonal

2. Answer the questions below. Directions are clear—try to follow them accurately. The questions are hard, but please answer quickly. Address any questions you might have to the graduate student.

<table>
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<tr>
<th>Feeling</th>
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<td>1 2 3 4 5 6 7</td>
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   Unfeeling | Cold | Impersonal

3. Please answer the following questions. I have made the instructions reasonably clear, I hope you will follow them as closely as possible. I understand that some of the questions may be hard, but please try to answer as quickly as you can. If you have any questions, just feel free to ask me.

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<th>Feeling</th>
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<tr>
<td>1 2 3 4 5 6 7</td>
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<td>1 2 3 4 5 6 7</td>
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   Unfeeling | Cold | Impersonal

4. Answer the questions. Directions are clear—follow them. The questions are hard, but do not waste time. Address questions to the administrator.

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<th>Feeling</th>
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<td>1 2 3 4 5 6 7</td>
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   Unfeeling | Cold | Impersonal

42
5. Please answer these questions. I have made the directions very straightforward, so do your best to follow them. I know that the questions are difficult, but try to respond as quickly as you can. Any possible questions you might have ask me.

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Unfeeling  Cold  Impersonal


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Unfeeling  Cold  Impersonal

7. Now please rate the test and the author of the test. Mark down the first impression that comes to mind. Try to respond quickly and honestly.

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<th>Feeling</th>
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Unfeeling  Cold  Impersonal

8. Now, if you will, rate my test and my efforts to develop it. Feel free to mark down the first impression that comes to your mind. Try to respond as quickly to the questions as possible. I know this may be difficult, but please be as honest as you can.

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Unfeeling  Cold  Impersonal


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Unfeeling  Cold  Impersonal

10. Now, if you will, please rate the test and the author of the test. Mark down initial impressions. Respond as quickly as you can and as honestly as you can.

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Unfeeling  Cold  Impersonal
Appendix B

The Task

This test is developed and presented by Star Muir, a graduate student at UCF, as a short, condensed effort to measure vocabulary, reasoning and logic.

(cold or warm orientation)

Vocabulary—try to choose the best definition for these words.

1. Sibilant
   a) children having one or both parents in common
   b) a Greek character who could foretell the future
   c) a substance that dries up moisture
   d) having a hissing sound
   e) living in, or being a citizen of, Sibilis

2. Inveigle
   a) to rail against
   b) to dress in veils, as for a dance
   c) to beguile or deceive
   d) invert
   e) to turn into another object, as by magic

3. Hegemony
   a) a musical mode
   b) a form of Greek poetry
   c) the opposite of entropy
   d) the predominance of one state in a confederacy
   e) the act of analyzing the linguistic structure of words

4. Solicitous
   a) all alone, without company
   b) anxious, troubled, or deeply concerned
   c) involved with a solicitor or lawyer (especially British)
   d) being perfectly united, or of one opinion, with a group
   e) the theory that involves the study of language
5. Archaic
   a) of, or pertaining to, arches
   b) pertaining to archangels
   c) retention or imitation of what is old or obsolete
   d) a former variation of the word archery
   e) of or pertaining to rainbows

6. Prerogative
   a) ruling powers of a state
   b) enjoyed by exclusive privilege
   c) original laws, prior to amendment
   d) newspaper freedom of information
   e) payment for special rights

Analogies—choose the word or number in the second pair that is most closely related to the first.

7. Celsius is to 0 as Fahrenheit is to:
   a) 100
   b) 0
   c) 32
   d) 212
   e) 112

8. The number 2 is to 8 as 5 is to:
   a) 15
   b) 100
   c) 125
   d) 10
   e) 60

9. 1789 is to France as 1649 is to:
   a) Germany
   b) Switzerland
   c) New Zealand
   d) United States
   e) England

10. Palette is to artist as kiln is to:
    a) potter
    b) painter
    c) goldsmith
    d) writer
    e) cook
11. Star is to constellation as constellation is to:
   a) sun
   b) earth
   c) galaxy
   d) planetoid
   e) moon

12. Halley is to comet as Broca is to:
   a) printing
   b) tires
   c) automobiles
   d) brain
   e) fruit

Mathematics, reasoning, and logic.

13. Multiply by 6 the number of 9's followed by 2, but not followed
    by 7, in the number below:
    92563123979864134928929596

    Result: ________________

14. X is less than Y; Y is not equal to Z. Therefore the
    statement that: X is not equal to Z is:
   a) correct
   b) incorrect
   c) undetermined

15. Three youngsters on our street went shopping for clothes in a
    very unusual clothing store. The owner charges $3 for a tie,
    $3 for a hat, and $5 for a shirt. How much would a jacket cost?

    Result: ________________
Appendix C
Dependent Measures
and
Other Information Requested

(cold or warm orientation)

The scale is 1-7, with 1 and 7 being extremes, and 4 being neutral.

Test Evaluation:

**Difficult**

1 2 3 4 5 6 7

**Easy**

**Effective**

1 2 3 4 5 6 7

**Ineffective**

(is an adequate short test of vocabulary, reasoning and logic)

**Good**

1 2 3 4 5 6 7

**Bad**

**Enjoyable**

1 2 3 4 5 6 7

**Unenjoyable**

Author Evaluation:

**Knowledgeable**

1 2 3 4 5 6 7

**Ignorant**

(knows what he is trying to test)

**Ineffective**

(does not know what he is trying to test)

**Effective**

1 2 3 4 5 6 7

**Ineffective**

(test well written)

**Unenjoyable**

(test not well written)

**Pleasant**

1 2 3 4 5 6 7

**Unpleasant**


Please supply this additional information for research purposes:

In my opinion, the written instructions for this test seem:

Cold 1 2 3 4 5 6 7 Warm

Major: ___________________________________________________________________

Number of Years in major: _______

Have you worked with computers or taken computer classes?

Yes  No

If yes, how many computer languages are you familiar with?

1 2 3 4 More

How technical, or scientific, has your education been at UCF?

Very technical Technical Neutral Non-technical Very non-technical
References


Reed, Sally. Schools enter the computer age. New York Times, April 25, 1982, section 12, pp. 1; 38.


