

Analysis of Sociocultural Constructs Applicable to Blue Force Teams: Increasing Fidelity from Pencil and Paper and Video Tests to Virtual Environments

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Abstract. Understanding sociocultural factors and the role they play in a military context is becoming recognized as a shortcoming within both military training and decision-making tools for commanders in the field. We begin by discussing sociocultural theory, its development, and history. Next, we discuss approaches to collecting small-scale friendly force leader and subordinate sociocultural factors. Then, we describe and discuss the utility of Situational Judgment Tests (SJTs) to elicit various sociocultural values in decision-making and how those tests may be translated to more enriched and life-like scenarios in virtual environments. Positive and negative attributes of each approach and viable resources to support their use are discussed.

Keywords: Sociocultural · Culture · Decision-making · Military · Data collection tools · Virtual environments · Situational judgment test

1 Introduction

Identifying socio-cultural factors that influence decision-making and communication is an important aspect of military training, personnel selection, and future military technology. The Army has responded to the needs of its leadership by providing increased support to enable “foreign language and cultural capabilities [1, 7]. In fact, the Army is highly interested in developing cultural competence to better plan and execute operations within coalition and multi-national forces as well as within the U.S. Army structure [1, 7, 10]. There are many facets to consider when discussing cross-cultural competencies (CCC) and socio-cultural variables. There are several methods to employ when assessing such constructs. There are important lessons learned derived from several sources that highlight the performance-based needs and the unity of the military unit and the cross-cultural understanding required to make today’s military operations successful.

While socio-cultural aspects have been studied in general populations for decision making [25], not very much has been performed for the military population. Some research has outlined command and control aspects or cognitive biases in decision-making [15, 16] Unfortunately, decision-making research for the military has not focused on the inclusion of culture and even less frequently on decision-making in a military environment [12]. Also, little research has been focused on the Soldier's/Commander's own socio-cultural attributes and how they may affect their decision making [8, 27]. With this in mind, the U.S. Army Research Laboratory's Human Research and Engineering Directorate (ARL HRED) partnered with the University of Central Florida to launch a research program entitled "Socio-Cultural Depiction for Decision-Making". This program is concentrated on understanding the socio-cultural factors that affect

Soldier/Commander decision-making, especially addressing how a Soldier's own cultural background influences his or her decision-making. A discussion of the taxonomy of socio-cultural factors that influence decision-making (created under the Relevant Information for Social Cultural Depiction (RISC-D) program) [33] and how it was developed follows.

Among lessons learned, a Joint Coalition Operational Analysis posited that the "Lack of unity of effort between civilian and military organizations tended to be a key component of transition challenges" [17]. Specifically cited was a "...lack of understanding of counterpart cultures and bureaucratic processes" [17]. Additionally, service culture was highlighted as a key attribute to instilling mission command and that our diverse military and civilian cultures while providing strength to our mission, still require greater understanding in terms of culture [17] This understanding will come in the form of identifying and establishing metrics to identify core CCC and to assess and train these competencies in our Army leadership.

2 Cross-Cultural Competency and Cultural Theory

CCC has been assessed by several prominent researchers who have outlined several different sets of knowledge, skills, and abilities (KSAs) to include awareness, communication skills, flexibility, self-regulation of reactions, empathy, non-ethnocentrism, and a willingness to learn about other cultures [6]. Selmesky [35] briefly defines CCC as "the ability to quickly and accurately comprehend, then appropriately and effectively engage individuals from distinct cultural backgrounds to achieve the desired effect". The definition of CCC varies and has been researched for several decades by Hofstede [13] who developed a well-recognized set of cultural dimensions including (1) Power Distance, (2) Uncertainty Avoidance, (3) Individualism/Collectivism (4) Masculinity/Femininity with (5) Long-term/Short-term Orientation [14]. Hofstede's dimensions of culture values have been well researched; however, there is dissent in the literature regarding the limitations of his work.

Kirkman, Lowe, and Gibson [18] in a review of Hofstede's work, acknowledge that while his sizable body of work is impactful for organizational cross-cultural research, researchers should consider additional cultural values. The authors also report that research using Hofstede's framework is weak in terms of effect size; small effect sizes

have been found in meta-analysis of over 180 studies with this framework especially on individualism-collectivism. Hofstede's work is also criticized as having a definition of national culture that is too narrowly defined and that his methodologies and data collection may have been too narrowly executed [4, 23]. As widely cited as Hofstede's work has been, there are several other promising cross-cultural frameworks to consider.

Schwartz [34], Smith and Dugan [37], and Graen and Uhl-Bien [11]. Schwartz [34] developed seven cross-cultural values including Conservatism, Intellectualism, Affective Autonomy, Hierarchy, Egalitarianism, Mastery and Harmony. Smith and Dugan [37] found three cross-cultural dimensions that correlated well with Hofstede's framework [14] to include Individualism/collectivism, Power Distance and Long- versus Short-Term Orientation. The authors concluded that masculinity/femininity and uncertainty avoidance were not required in later research efforts. The work by Graen and Uhl-Bien [11], called the leader-member exchange theory, is premised upon the idea that good leadership comes about when there is a high team (leader-member) level of mutual trust, respect, and obligation. While several theories exist to help explain cultural competencies, the measure of these frameworks and constructs is also varied [31].

There are several ways in which to collect CCC data including questionnaires, surveys, and specific CCC tests. Specific CCC tests of reasonable validity include the Cultural Quotient (CQ) [2], the Intercultural Adjustment Potential Scale (ICAPS) [22], and the Multicultural Potential Quotient (MPQ) [39]. These three CCC tests were viewed as having the best potential over such measures as personality and intelligence tests although the factor structure of these tests may require further confirmatory factor analysis [21]. CCC data can also be collected at the individual level as noted above, and at the organizational level. Several approaches are useful for collecting organizational CCC. These methods include aggregating individual level CCC data, ethnographic methods, and measuring performance [40]. Another method includes the situational judgment test.

3 Situational Judgment Tests

Situational Judgment Tests or SJTs are popular as personnel selection tests are designed to elicit judgment choices or decisions to be made in the context of job "situations" for various job-related content [28, 32, 36, 41, 42]. SJTs are typically formatted to be multiple choice and have been used for the better part of a century. SJTs are commonly thought of as highly predictive of job performance. In fact, Christian, Edwards, and Bradley [6] found SJTs to have high validity for assessing teamwork, leadership, and interpersonal skills. One caution in using SJTs is that the constructs measured should be of primary concern over the methodological (simulating the work environment) [6, 30]. There are several modalities through which SJTs can be presented including paper-and-pencil tests, video presentations, and multi-media formats. All of these formats have varying fidelities.

Fidelity within SJTs is the consistency with which the created job situation, or task stimulus, is related to the way it is represented in the actual workplace. For example, written format SJTs are presented on paper and the participant is asked to select a response from the alternatives, which is considered a low-fidelity option. As an

alternative, video-based job scenarios offer a pre-canned workplace scenario that is then halted to ask the participant to select from the range of possible responses. In video format, responses are presented visually with narration [19]. Video format is reported to be higher in predictive and incremental validity over paper-and-pencil tests for interpersonally based SJTs, although face validity may have no significant differences [20]. The authors and others further report that the higher fidelity of the video format and its closer resemblance to actual job situations are the sources of the increased validity [26]. In today's selection environment, these video-based or multi-media presentations of job situations would most likely be made available using DVD technology; however, virtual environments provide another presentation medium alternative.

4 Virtual Environments

Virtual environments (VE) have been used extensively for cross-cultural training [8] and offer the potential for interactive SJTs with increased richness and detail [19]. While Lievens, Peeters, and Schollaert posit that multi-media SJTs have a lower cognitive loading, Lievens Sackett [20] report that on an interpersonally-based video SJT, the lowered cognitive loading contributed to higher predictive and incremental validity. The cognitive load issue remains invalidated, although it appears that lowering the cognitive load is a positive attribute to multi-media and VE presentation formats for SJTs. The selection of the specific virtual environment is an important one with various options to be considered.

First, the time and cost of producing SJTs is considerable. Producing video segments with scripts, filming and editing, and human actors require a great deal of logistical and financial resources which may be defrayed by employing photorealistic animation [3]. VE presentation can also provide "nested" or interactive scenarios that are driven by participant responses, providing rich data analysis opportunities. Additionally, the biases or adverse impacts that SJTs have towards race, sex, and age [19] may be more easily tested using avatars that suit the particular participant at the time (by simply altering the race, age and gender). The specific environment to be used for testing VE SJTs will impact the utility and scope of the SJT and several environments are available including those at the ARL HRED Simulation and Training Technology Center (STTC) in Orlando, Florida.

STTC currently has several state of the art VE's available including the Enhanced Dynamic Geo-social Environment (EDGE) [9] Another VE, MOSES, provides large scale terrain for training and for smaller-scale operations such as room-clearing, but may not have the capability to provide very specific construct-based training such as that required for cultural awareness [5].

EDGE may provide this additional capability that is lacking in MOSES. This is important since technology gaps for cultural training were identified by several Soldiers during a training event using the facility [38]. EDGE is capable of providing a rich virtual character set and an array of virtual objects to create a military "job experience". It is foreseeable that the future of SJTs may enable taking on a role of a "character" of one's self with which to interact with a "job situation" that is loaded with socio-cultural context on which decisions can be selected. While some research purports that

paper-and-pencil tests are superior to game-based coursework [24], we feel that taking SJTs to the virtual environment is an important next step for advancing the state of the art in assessing socio-cultural attributes of military team members.

5 Conclusion

Building VE SJTs certainly have both benefits and drawbacks. We may carefully examine some of the difficulties in building VE SJTs including determining what theoretical foundation will be followed, how adverse effects for bias towards age, sex, and race [30] may be accounted for, and to ensure that the SJT virtual content validity and reliability concerns are addressed. While some multi-media SJTs have paved the way for this effort. For example, Rockstuhl, Ang, Ng, Lievens, and Van Dyne [29] have recently created multi-media SJTs which successfully demonstrated the incremental reliability of situational assessment prior to response selection. The step from multi-media to representative VE representations may be difficult to replicate, however, once deciding on how to best build VE SJTs, there will be several potential Army benefits.

Interactive SJTs that rely on VEs such as EDGE may produce several Army benefits. The benefits of using VE SJTs are not only the task performance and interpersonal citizenship prediction [6] but also may include the judgment of the job situation itself [28], which is emerging in the SJT literature [29]. Relatively low-cost socio-cultural training ability with feedback based upon both (1) perception and interpretation of the situation and (2) the selection of possible final responses may be possible. Personnel selection for the Army may also experience incremental validity for those officers and enlisted Soldiers who are likely to be placed into judgment situations with socio-cultural context. The benefits include a highly immersive and engaging environment with less-than multi-media production costs, founded on sound psychological theory and frameworks. We propose that VE-based SJTs should be developed as both training and selection tools to bolster the Army need for enhanced socio-cultural support.

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