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Persuasive Communication from a Military Force to Local Civilians

A Cognitive Treatment of PsyOps Messages Based on the Elaboration Likelihood Model

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ABSTRACT

Here is presented a model of message processing using one of the leading paradigms in social psychology of persuasion as main theoretical framework: the Elaboration Likelihood Model (ELM). Adapting this dual process theory to military context and actions and more specifically psychological operations in asymmetric conflicts allows developing a model taking into account many message characteristics as well as specific factors such as local culture of the audience. It focuses on measuring capacity and motivation of the agents to determine the effect of message sending on attitudes through a detailed cognitive treatment.

Keywords: Persuasive communication, PsyOps, COIN, Intelligent agents, Social-cognitive simulation, Culture, Elaboration Likelihood Model

INTRODUCTION

Psychological Operations are widely recognized as a tool of great relevance by the militaries when it comes to reestablish stability in a war torn foreign country. By sending messages directed on carefully chosen info-targets by various means of communication, these communication operations allow not only to undermine enemy morale or intelligence, but more importantly to influence the perceptions of a local population usually caught between conflicting interests and agendas. The fact that the boundaries between local people and warring factions preying upon them are most of the time blurred makes the attitudes of the locals an all the more decisive factor of the outcome of counter insurgency, peacekeeping and peacebuilding missions. Modelling these psychological operations and their effects in the framework of a training system is necessary but challenging considering the number of factors involved. If it is to be predictive, it has to comprise an important number of intelligent agents forming the population and an accurate representation of the cognitive processes they execute when receiving persuasive messages. These are the objectives of SICOMORES (SImulation COnstructive et MOdélisation des effets des opérations d'influence dans les REseaux Sociaux). This paper leaves propagation to future publications and focuses on communication between the military force and direct civilian info-targets.

In the next section the related research on PsyOps and persuasive communication modeling is introduced, and then in the following section the SICOMORES theoretical bases for persuasion

are presented. The fourth section details the static component of the system, notably the general human framework of the environment, and the following section the model dynamics, i.e. the message processing model. The last section concludes the paper.

RELATED WORK

Consistently with the industrial context, quite a few systems modeling PsyOps actions exist.

SHOUT (Van Vliet, Huibregtse, & Van Hermert, 2011) for instance, is a simulator of message dissemination on a virtual theatre of war (XLand) emulating an African failed state comprising two religions and different political actors. Agents in the network are only communities and the tool aims primarily at producing propagation results, allowing to know which communities have been reached by a given message, therefore there is no individual cognitive processing of messages. Propagation is epidemiological and the theoretical basis for communication parameters is limited to the well-known Laswell media model (Laswell, 1948).

The CAPRICORN architecture (Khimeche, Frydman, Faucher et al., 2012), primarily developed for an Afghan scenario (Kapisa region) and allowing experimentation with PsyOps, CIMIC (civil-military cooperation) and Info-Ops, has seen some extensive developments (Bruzzone, Massei, Poggi, et al., 2015). While currently comprising a population model with some interest groups and complex agents possessing detailed emotional attributes and using fuzzy rules to estimate the effects of influence operations, the model simulates mainly military procedures and does not make use of social psychology theories of persuasion.

The Polias system (Brousmiche, Kant, Sabouret, et al., 2014) is also explicitly related to the context of asymmetric warfare and simulates PsyOps actions, but the model goes further by integrating attitude formation though witnessing of military actions, and communication and influence between agents within a group. Built on the concept of attitude developed in the field of social psychology, the model mainly concerns itself with attitude dynamics (construction and change) and influence as a social phenomenon based on belief exchange, more than with a persuasion process in the strictest sense. It incorporates a few chosen variables such as source credibility or unexpectedness in the cognitive treatment and uses only 100 cognitive agents for experimentation.

Some other interesting computational models have been developed, focusing more or less on military applications and, if not specifically on psychological operations, on the closely related problem of media influence. COMPOEX (Bennett, 2009), for instance, aims at assisting military planners in understanding the complex dynamics of international interventions by integrating a whole library of generic interacting models which can be instantiated by experts, thus producing an extensive and flexible architecture simulating an entire theatre of operations. Notably integrating a model of media influence (MIM) built on a rich theoretical background, it represents in a time discrete paradigm the media message production, access, flow and impact on population segments characterized by attitudes, but does not seem to make use of the possibilities of

multi-agent modeling to simulate individual cognitive processing of messages. The PEBM (Gonzalez-Avella, Cosenza, Klemm, et al., 2007) is of interest as a simulation exploring direct and indirect media influence on a culturally complex population composed of interacting agents receiving messages and providing feedback, but the impacted attitudes seem to be only the cultural attributes of the agents, as the model is focused on cultural dissemination and the emergence of culturally uniform communities.

To our knowledge, the research developed by Mosler et al. (Mosler, Schwarz, Ammann, et al., 2001), aiming at exploring the polarization of attitudes phenomenon, proposes the only computer-simulation model of the prominent Elaboration Likelihood Model of persuasion (Petty & Caccioppo, 1986). It instantiates only two agents alternately exchanging messages characterized by argument quality and peripheral cues and updating their attitudes as a result, in accordance with the theory. A noisy channel impairing argument quality is simulated for added realism. Such a model of bidirectional communication is adapted for discussion or debate simulation, but not for the context of mass media unidirectional communication.

Overall, none of these systems seems to combine agents cognitively sophisticated enough with a computational model of persuasion based on state of the art social psychology models, to be used on a large virtual culturally realistic population. Yet it would seems to be one of the best option to explore for adequately addressing the need expressed by the subject matter experts, as they refer to such theoretical body of knowledge themselves.

THEORETICAL BASIS

As most importantly stated by Petty and Brinol (Petty & Brinol, 2008), the number of variables able to affect persuasion is potentially infinite. Designing a persuasion model means to heavily compromise, taking into account a combination of the most researched and the seemingly most relevant ones. The Elaboration Likelihood Model (ELM) (Petty & Caccioppo, 1986) is a leading paradigm in social psychology of attitudes and persuasion, developed as a dual-process theory. The original hypothesis is that two routes to persuasion exist: a central route based on relatively extensive elaborative message processing and a peripheral route requiring a less effortful cognitive treatment. Still discussed and refined (Petty & Wegener, 1999), it introduces a complex cognitive behavior for the agents and subsequently appears as a legitimate framework.

Unsurprisingly, use of the ELM for agent-based modeling is challenging. As research has been going forward, it has produced subtle analyses of numerous mechanisms and variables interacting with each other and affecting attitude change, and getting data for the attributes participating in the elaboration process is difficult. Hence, some variables have to be left aside in our model considering how difficult they are to evaluate and incorporate (mood, distraction, self-monitoring for instance), others have to work in a simplified way (source expertise). We are fully aware of the perfectibility of this, but increasing the level of randomness to such extent would be detrimental. Generally, variables can

affect intensity or orientation of mental processing. The ELM being explicitly generic enough to include evaluative and non-evaluative judgements, an engaging feature as it allows simulating the infinity of possible messages with the same mechanisms without needing image recognition or text semantic analysis, we will mostly deal with variables as they affect intensity of cognitive activity. We focus on modeling some essential conclusions of the model:

- The two routes can lead to attitude change (i. e. effective persuasion) for a particular individual.
- The degree of elaboration, i.e. the extent to which the message is scrutinized by the receiver, depends on his ability and motivation to do so. There is an elaboration continuum, at the high end of which ability and motivation, and thus mental effort, are high, and at the low end of which all of these are reduced.
- Ability and motivation to process the message vary with individual and situational factors (including message characteristics).
- A variable can affect the process by serving as persuasive argument or peripheral cue according to the circumstances.
- As motivation and/or ability is increased, argument scrutiny is increased and peripheral cues become relatively less important determinants of attitude change. Conversely, if motivation and/or ability is decreased, they become relatively more important determinants of attitude change. There is a tradeoff between influence of central and peripheral elements.

The other leading and main competitor framework, the Heuristic-Systematic Model (HSM) (Chaiken, Liberman, & Eagly, 1989) is interestingly enough also a dual-process theory and postulates two quite similar routes. Both models also make an assumption of least effort (a receiver treats messages with minimal cognitive resources unless motivated to do otherwise). However, the HSM insists on the possibility of the co-occurrence and independent (although coherent) effects on attitudes of the two routes (Chen & Chaiken 1999), making the model less approachable for implementation than the ELM. In any case, even if some other paradigms are being researched and developed (Kruglanski, Thompson, & Spiegel, 1999) they are not as analytically fruitful at the current stage, and there are therefore strong theoretical justifications for developing a computational model of persuasion as a dual process.

STATISTIC COMPONENT

General Human Terrain

SICOMORES is a multi-agent system in which each node represents quite a highly complex and intelligent individual. The main implication of this feature is that, considering the state of the art of virtual population generation, it is not yet possible to experiment with a number of agents high enough to realistically

reconstruct the whole population of a country. But in order to obtain an optimal dissemination of information process, two elements are of paramount importance: simulating the cognitive processes of message treatment involving individual features and correctly capturing and representing a relevant socio-cultural context, i.e. the complex sociality of each and every person, in the form of a network. Hence, the choice of a multi-dimensional social network (Berlingerio, Coscia, et al., 2013) comprising only individuals appears optimal here.

Subsequently, the method is to generate a representative fraction of a particular population, around 10,000 intelligent agents, making SICOMORES a mid-range agent-based model in term of size. We produce a flexible architecture allowing the use of actual socio-demographic data to create the nodes and network, depending on availability and level of specificity needed. As we focus on sub-Saharan Africa as a case study, a population corresponding to a sample of Central African Republic capital city Bangui inhabitants has been generated and is presently used.

Each individual in the system is an instance i of the INDIVIDUAL frame and so described by a set of attributes and variables:

- Social features: Gender, age, social level ([1, 10]), religion, ethnicity, political opinion, role in the family, leader status.
- Cultural features: Cultural values system {(type of cultural feature, cultural feature, importance ([1, 10]))}
- Reachability features: Language(s), Literacy, reachable by radio, reachable by television, reachable by text message.
- Psychological features: Opinion toward the Force ([1, 10]), intellectual level ([1, 10]), needs {(need, satisfaction degree ([1, 10]))}

The role in the family can be husband, wife, child or related individual and different family configurations are simulated (nuclear, enlarged, extended). The political opinion indicates belonging to one of the political factions represented on the political layer. Some agents are assigned specific roles such as head of family, political leader or religious leader. A Head of family can be feminine or masculine but can only be leader if masculine, and a leader can be either political or religious, but not both at the same time. The cultural values system of the agents depends on the particular society which is to be emulated, the different features being organized by types such as values, rituals, heroes… (see Fiske, 2002 for instance). As culture is a collective phenomenon in nature, all agents making up the population share the same cultural features, but the respective importance of these features varies from one agent to another as each individual internalizes his own culture and its elements differently in connection with his own development. Hence, the different groups within the virtual society are not strictly defined by different cultural systems but by the different social layers, some of them linked to specific characteristics, such as religion or political opinion.

Overall, the different layers in our network are: family, neighborhood, friendship, partisan (political), partisan (religious) and war-time (representing links generated by communitarianism and violence, religious or ethnic). The links

are generated in accordance to an ego-network perspective. The porosity and interlinkage between the religious and political domains characterizing Africa today is represented by similar structural properties in the religious and political layers of the network itself.

Such a variety of links coupled with such a set of individual attributes aims at representing a credible number of culturally realistic agents by sacrificing neither the cognitive nor the social sophistication needed, a delicate equilibrium (see Zacharias, Macmillan, & Van Hemel, 2008).

PsyOp characteristics

In our system a PsyOp action is treated as a discrete event. Being primarily intended for use by military specialists in training, the system asks for each action to be described by numerous parameters used as input, the setting of which is quite demanding on purpose. Let p be a PsyOp represented as an instance of the PSYOP frame:

- Theme
- Desired info-targets
- Accentuated cultural feature(s)
- Flouted cultural feature(s)
- Medium
- Targeted indicator
- Appeal to curiosity/attention ([1, 10])
- Presenter {(attribute, value)}
- Expertise of the source ([0, 10])
- Highlighting of the theme ([1, 10])
- Legibility of message support (technical noise) ([1, 10])
- Clarity of content (didactical quality) ([1, 10])
- Complexity of content ([1, 10])
- Number of arguments ([1, 10])
- Type of discourse (one sided, refutational two-sided)
- Arguments quality ([1, 10])

The desired info-targets are the precise type of agents the PsyOps aims at reaching and affecting on the theater, but they are sometimes different from the direct info targets. Indeed the latter are determined by the chosen medium, which can have a broad coverage, for instance radio broadcast or loudspeakers, making the desired info-targets a subgroup of the direct info-targets. This important distinction allows simulating the fact that untargeted agents can nonetheless receive the message and process it for results on their attitudes difficult to forecast and sometimes unwanted by the military force. The role of local culture in determination of the effect for any receiver is pivotal here as cultural features accentuated or flouted by the message are listed.

The targeted indicator refers to a list of possible variables related to attitudes the military would want to alter, some being attributes of each individual agent

(Opinion toward the Force), some being calculated by specific mechanisms at a macro level (Social Cohesion for instance).

MODEL DYNAMICS: MESSAGE PROCESSING FOR EACH INDIVIDUAL

General scheme

Here is the general model of message treatment used in SICOMORES and mainly based on the ELM postulates. It integrates the possibilities of a purely peripheral treatment, and of mainly central and peripheral treatments.

All formulas for this persuasion model are designed following the principles of Ordered Weighted Averaging Operators (OWA) introduced by Yager (Yager, 1988).

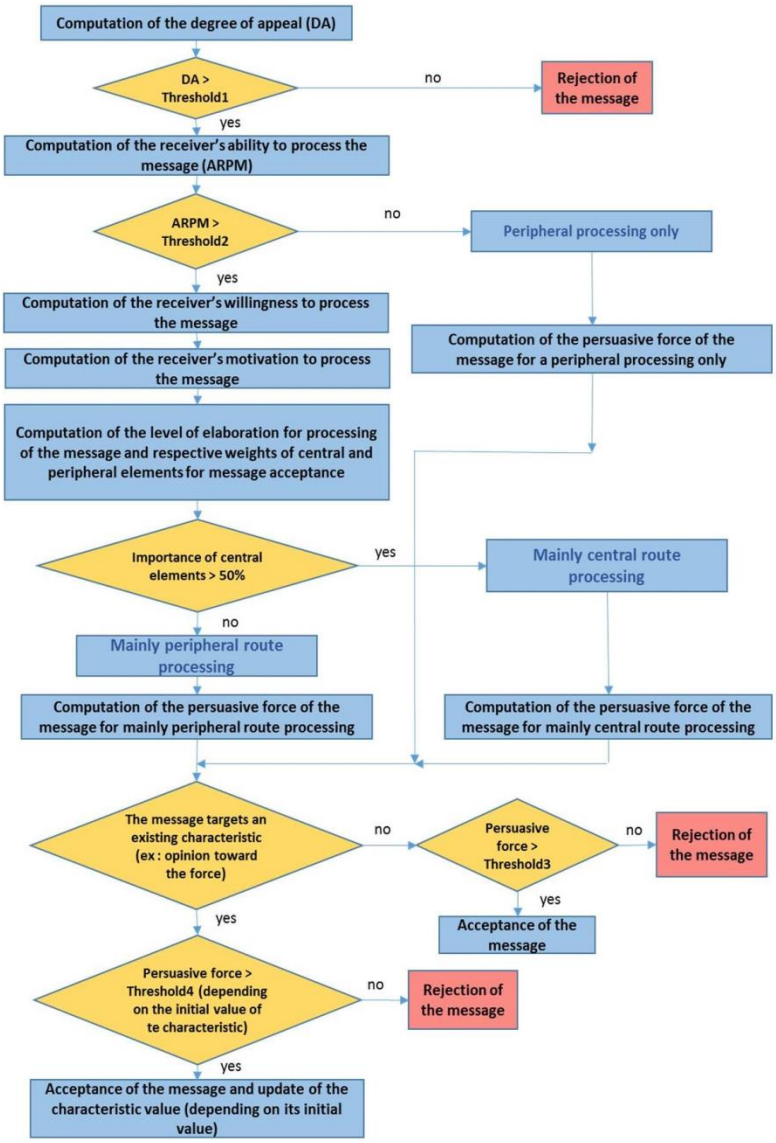

Figure 1. Model for the cognitive processing of a message by the receiver. Insert caption here.

Degree of appeal of the message (first component of motivation)

According to the seminal theory of McGuire (Mc Guire, 1985), a message has to catch the attention of the receiver in order to be processed, with high cognitive activity or not. We integrate this theory in our framework by dividing the measure of motivation into two steps, the first computation taking into account the variables linked to this specific step, as computation of the Degree of Appeal (DA). The Appeal to Curiosity can be manipulated by the sender and as such appears as a characteristic of the message, but the aim here is to represent the influence of individual and situational factors as well.

First, the Degree of Similarity between the Receiver and the Presenter (DSRP) is computed if there is a speaker (for radio or TV), taking into account multiple attributes and variables. The more similar the presenter is to the receiver, the higher the chances are of the attention of the latter being caught by the persuasive communication.

If the PsyOps p makes use of a presenter, let $char_1,\ldots,char_n$ be the characteristics of the presenter specified by the user among Gender, Religion, Ethnicity, Political Opinion, Role in the family, Leader status, Social level, Intellectual level and Age.

Let Comparison($char_k$,i,p) = semantic-proximity($char_k$,$char_k$(i),$char_k$(Presenter(p))) be the mathematical function evaluating semantic proximity between the values of the characteristic $char_k$ of the receiver i and of the presenter of the PsyOps p.

We define:

Semantic-proximity(Gender,x,y) = Semantic-proximity(Religion,x,y) = Semantic-proximity(Ethnicity,x,y) = Semantic-proximity(Political opinion,x,y) = Semantic-proximity(Role in the family,x,y) = Semantic-proximity(Leader status,x,y) = (x = = y)
(boolean corresponding to syntactic equality between x and y)

Semantic-proximity(Social level,x,y) =
Semantic-proximity(Intellectual level,x,y) =
$(10-|x-y|)/10$

Semantic-proximity(Age,x,y) = (E(|x-y|/10) = = 0) +
(E(|x-y|)/10) = = 1) . 0,8 +
(E(|x-y|)/10) = = 2) . 0,6 +
(E(|x-y|/10) = = 3) . 0,4 +
(E(|x-y|/10) = = 4) . 0,2

(E(a/b) meaning the integral part of the division of a by b).

$$\mathrm{DSRP}(i, p) = \sum_{k=1}^{n} \mathrm{comparison}(char_k, i, p) / n \quad (1)$$

The idea of interest in the theme is also measured, by Involvement by Cultural Features (ICF).

Let q be the number of cultural features of $\{cf_1, \ldots, cf_n\}$ with a value above 7 in Cultural values system(i) and $imp_1, \ldots, imp_n$ their respective importance.

$$\mathrm{ICF}(i, p) = \frac{1}{10}.\left(\frac{1}{n}.\left(\sum_{i=1}^{n} imp_i\right) + \frac{q}{n}.\left(10 - \left(\frac{1}{n}.\sum_{i=1}^{n} imp_i\right)\right)\right) \quad (2)$$

DA is then defined as follows:

$$\mathrm{DA}(i, p) = \frac{1}{4}.\left(\frac{\text{Appeal to Curiosity}(p)}{10} + \frac{\text{Highlighting of the Theme}(p)}{10} + \mathrm{DSRP}(i, p) + \mathrm{ICF}(i, p)\right) \quad (3)$$

In the system SICOMORES the user has to choose between religious and ethnic communitarianism to characterize the kind of conflict happening on the theatre. If there is a presenter and his religion is specified in a religious communitarianism context or if his ethnicity is specified in an ethnic communitarianism context, then DA is slightly increased:

$$\mathrm{DA}(i,p) = \mathrm{DA}(i,p) + (1 - \mathrm{DA}(i,p) \times 0.1) \quad (4)$$

If DA is below a certain threshold (to be determined by experimentation), the receiver does not feel concerned enough to further process the message and rejects it. If not, then the DA is stored.

Ability of the receiver to process the message

If the medium conveys only written text and the receiver is illiterate, the process stops. If not, the Ability of the receiver to process the message (ARPM) is computed.

We first calculate the Cognitive Hindrance (CH) related to the dissatisfaction of certain needs, as harsh living conditions faced by civilians in a war situation can undermine their cognitive abilities. Four needs are relevant to compute CH in

a given context as we focus solely on physiological wellness and ability to function at this stage: water, food, housing (related to amount and quality of rest) and health. They are respectively named $n_{w,}$ $n_{f,}$ n_h and n_h. Their respective values range between 1 and 10 and only needs among those four with a value under 5 are considered as those with a value of 5 or higher are satisfied enough not to generate any cognitive hindrance.

Let q be the number of needs with a value strictly lower than 5 and N1 the set of these needs N1 = $\{n_1, \ldots, n_q\}$

Let q' be the number of needs with a satisfaction degree lower or equal to 2.

$0 \leq q \leq 4$, $0 \leq q' \leq 4$, $q' \leq q$

$$\text{Cognitive Hindrance}(i, p) = \frac{1}{20}.\left(\sum_{i=1}^{q}\left(5 - sd\left(n_i\right)\right) + \frac{q'}{q}.\left(20 - \sum_{i=1}^{q}\left(5 - sd\left(n_i\right)\right)\right)\right) \quad (5)$$

The Clarity of Content Impact (CCI) is then computed by aggregating the Clarity of the message and the Intellectual Level of the receiver:

$$\text{CCI}(i, p) = \frac{1}{2}.\left(\frac{\text{Clarity of Content}(p)}{10} + \frac{\text{Intellectual Level}(i)}{10}\right) \quad (6)$$

After that the General complexity of the message (GCM) is defined as follows:

$$\text{GCM}(p) = \frac{1}{3}.\left(\frac{\text{Complexity of Content}(p)}{10} + \frac{\text{Number of Arguments}(p)}{10} + \text{Type of Discourse}(p) == \text{refutational two sided}\right) \quad (7)$$

ARPM is then computed by aggregation of all the relevant variables:

$$\mathrm{ARPM}(i,p) = \frac{1}{4}.\left(\begin{array}{l}\dfrac{\text{Legibility of Support}(p)}{10} + \left(1-\mathrm{CH}(i,p)\right) + \mathrm{CCI}(i,p) + \dfrac{1}{2}. \\ \left(1-\mathrm{GCM}(p) + \dfrac{\text{Intellectual Level}(i)}{10}\right)\end{array}\right) \quad (8)$$

Willingness to process the message (second component of motivation)

If ARPM is below a certain threshold (to be determined during experimentation), the receiver will follow a purely peripheral route to persuasion by force, being unable to thoroughly scrutinize the message and its content even if motivated to do so.

Personal implication is of outmost importance in determining the motivation to process a persuasive message (Petty, Priester, & Wegener, 1994). We cannot of course evaluate the personal interests of each agent, but an audience member is more likely to feel concerned subsequently scrutinize a message if its content deals with elements of his own culture. The Level of Personal Relevance for the receiver is computed by using the number of concerned cultural features (accentuated and flouted) and their respective importance for i:

$$\text{Level of Personal Relevance}(i,p) = \frac{1}{n}.\frac{1}{10}.\left(\sum_{i=1}^{n} imp_i\right) \quad (9)$$

The need for cognition is also a very important variable for message processing (Petty & Brinol, 2008). However, as we are of course unable to accurately evaluate such an attribute for each agent, we make the reasonable postulate that the need for cognition of an individual is equal to his intellectual level. The Willingness to Process the Message (WPM) is then computed by aggregating the two factors:

$$\mathrm{WPM}(i,p) = \frac{1}{2}.\left(\text{Intellectual Level}(i) + \text{Level of Personal Relevance}(i,p)\right) \quad (10)$$

Motivation to process the message

We then proceed to aggregate the two components of motivation to finally compute the Motivation of the Receiver to Process the Message (MRPM):

$$\mathrm{MRPM}(i,p) = \frac{1}{2}.\left(\mathrm{DA}(i,p) + \mathrm{WPM}(i,p)\right) \quad (11)$$

Elaboration Degree of Message Processing (EDMP)

The elaboration degree results from aggregation of capacity and motivation of the receiver. Weights of central and peripheral elements work as a trade-off (Petty, Priester, & Wegener, 1994) (Petty & Wegener, 1999):

$$\mathrm{EDMP}(i, p) = \frac{1}{2}.\left(\mathrm{ARPM}(i, p) + \mathrm{MRPM}(i, p)\right) \quad (12)$$

$$\text{Weight of Central Elements}(i,p) = \mathrm{EDMP}(i,p) \quad (13)$$

$$\text{Weight of Peripheral Cues(i,p)} = \text{1-Weight of Central Elements(i,p)} \quad (14)$$

If EDMP is above 0,5 it means the receiver is engaging a mainly central processing of the message, if not it is a mainly peripheral processing. In accordance with the model, some factors will serve different roles in the algorithms depending on the king of ongoing processing.

Persuasive force of the message

If the receiver engages in a peripheral processing only, only peripheral clues are taken into account for computation of the persuasive force of the message, i. e. the Number of Arguments, the Degree of Similarity between the Receiver and the Presenter, and the level of Source Expertise. Arguments quality has no influence in this case as the receiver does not scrutinize them.

$$\text{Persuasive Force of the Message for Peripheral Processing Only}(i, p) = \frac{1}{3}.\left(\frac{\text{Number of Arguments}(p)}{10} + \mathrm{DSRP}(i, p) + \frac{\text{Source Expertise}(p)}{10}\right) \quad (15)$$

In the case of a mainly central treatment of the message, the persuasive force depends on the respective persuasive forces of central elements (PFCEMCP) and peripheral clues (PFPCMCP) for mainly central processing, and on the respective weight of central elements (WCE) and peripheral cues (WPC). In such a case, the parameters determining the degree of complexity of the message can have a positive effect on persuasion as they measure the level of sophistication of the line of argument. A refutational two-sided message is for instance more convincing than a one-sided discourse.

$$\text{PFCEMCP}(i, p) = \frac{1}{3}.\left(\frac{\text{Arguments Quality}(p)}{10} + \frac{\text{Source Expertise}(p)}{10} + \text{General Complexity of the Message}(p) \right) \quad (16)$$

$$\text{PFPCMCP}(i, p) = \frac{1}{2}.\left(\frac{\text{Number of Arguments}(p)}{10} + \text{DSRP}(i, p) \right) \quad (17)$$

$$\text{Persuasive Force of the Message for Mainly Central Processing}(i, p) = \frac{1}{2}.\left(\text{PFCEMCP}(i, p) \times \text{WCE}(i, p) + \text{PFPCMCP}(i, p) \times \text{WPC}(i, p)\right) \quad (18)$$

When a mainly peripheral processing occurs, the persuasive force of the message depends on the respective persuasive forces of central elements (PFCEMPP) and peripheral clues (PFPCMPP) for mainly peripheral processing, and on the respective weights of central elements (WCE) and peripheral clues (WPC):

$$\text{PFCEMPP}(p) = \frac{\text{Arguments Quality}(p)}{10} \quad (19)$$

$$\text{PFPCMPP}(i, p) = \frac{1}{3}.\left(\frac{\text{Number of Arguments}(p)}{10} + \text{DSRP}(i, p) + \frac{\text{Source Expertise}(p)}{10} \right) \quad (20)$$

$$\text{Persuasive Force of the Message for Mainly Peripheral Processing}(i, p) = \frac{1}{2}.\left(\text{PFCEMPP}(i, p) \times \text{WCE}(i, p) + \text{PFPCMPP}(i, p) \times \text{WPC}(i, p)\right) \quad (21)$$

Message acceptance

If the Persuasive Force is above a certain threshold (to be determined during experimentation and with the help of military experts), then the message is accepted by the individual. If below, it is rejected.

If the message targets a characteristic of the receiver, such as his Opinion toward the Force, the threshold is modified according to the initial value of the characteristic. This is a minimal way of integrating the possibility of bias in the model. The ELM insists on the fact that some motivational or ability factors can produce biased processing, but most are hard to evaluate and take into account (deficient memory for instance) while not necessarily affecting the level of elaboration or producing a biased outcome (Petty, Priester, & Wegener, 1994). While such a range of possibilities cannot be systematized at this stage, manipulating the acceptation threshold in relation to the initial value of the characteristic is a way to produce a simple bias effect, favorable or unfavorable, corresponding roughly to prejudice and perceived prior knowledge of the agent. Overall, strong attitudes, denoted by very weak or very high initial values, are particularly difficult to alter (Krosnick & Petty, 1995), justifying a higher threshold for acceptance of messages going against such attitudes. If the message is accepted, the characteristic value is updated.

If the message does not target such specific characteristic, the threshold will be average by default.

CONCLUSION

We have presented in this paper a general model of persuasive communication tailored for the military context of Psychological Operations, or PsyOps, and within the framework of SICOMORES, a training system simulating the effects of actions of influence initiated by a foreign force on a local population in a situation of asymmetric warfare. This model of cognitive treatment aims at grasping in an innovative manner the mechanisms determining the effects of such messages at the individual level while integrating the role of internalized collective factors such as cultural features. As the present paper details only the communication process from Force to locals, which is the first step of any PsyOp, the next stage will be to produce and implement an accurate model of propagation to experiment with the second step, i.e. the spreading of messages on a node to node basis. The social network has been designed for this purpose, and will ultimately allow obtaining some simulation results for the whole process. This is a work in progress and a rigorous work of validation, notably by sensitivity analysis, will also be a primary concern, as our system integrates a great number of parameters.

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