

# PSYMDEV, a System Intended for Assisting the Military Analyst to Construct Psychological Messages

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## ABSTRACT

In asymmetric conflicts, the Armed Forces generally have to intervene in countries where the internal peace is in danger. They must make the local population an ally in order for them to be able to deploy the necessary military actions with its support. For this purpose, psychological operations (PSYOPS) are used to shape people's behaviors and feelings by spreading out messages thanks to different media (tracts, loudspeakers, video clips, etc.). In this paper, we present PSYMDEV (PSYchological Message DEViser), a system that helps the military analyst to construct messages that trigger specific feelings in members of the population selected by social criteria like age or political opinion and called the *info-targets*. Given such a sociocultural group and a feeling that the latter must feel, the system provides a *twofold-situation* that consists of, on the one hand, a *categorization-situation* meant to induce a positive or negative initial state of mind in the *info-targets* depending on the type of feeling to be triggered through a psychological mechanism inspired by theories stemming from Social Psychology and an *action-situation* aiming at effectively triggering the specific feeling through a psychological process explained by the Intergroup Emotion Theory, an extension of the Appraisal Theory of Emotions. These situations are illustrated by means of images or a film or some auditive elements, thanks to adapted media generally used by the military like tracts or video clips, for example. Therefore, the twofold-situation gives birth to a psychological message intended to trigger a feeling. After presenting the theories underlying the system and its overall structure and functioning, we more specifically focus on the conception of a categorization-situation.

**Keywords:** Psychological Operations, Appraisal Theory, Intergroup Emotion Theory, Social Categorization Approach, Common Ingroup Identity Model, Sociocultural Identity, Situation, Sociocultural knowledge.

## INTRODUCTION

In asymmetric conflicts, the Armed Forces generally have to intervene in countries where the internal peace is in danger. They must make the local population an ally in order for them to be able to deploy the necessary military actions with its support. For this purpose, psychological operations (PSYOPS) are used to shape people's behaviors and feelings by spreading out messages thanks to different media (tracts, loudspeakers, video clips, etc.). In this paper, we present PSYMDEV (PSYchological Message DEViser), a system that helps the military analyst to construct messages that trigger specific feelings in members of the population selected by social criteria like age or political opinion and called the *info-targets*. Given such a sociocultural group and a feeling that the latter must feel,

the system provides a *twofold-situation* that consists of a *categorization-situation* meant to induce a positive or negative initial state of mind in the info-targets depending on the type of feeling to be triggered, through a psychological mechanism inspired by theories stemming from Social Psychology and an *action-situation* aiming at effectively triggering the specific feeling, through a psychological process explained by the Intergroup Emotion Theory, an extension of the Appraisal Theory of Emotions. These situations are illustrated by means of images or a film or some auditive elements, thanks to adapted media generally used by the military like tracts or video clips, for example. Therefore, the twofold-situation gives birth to a psychological message intended to trigger a feeling.

In this paper, we present the theories stemming from the Psychology of Emotions and Social Psychology that underlie PSYMDEV. We then explain the notion of salience of a social identity that is essential to our system and we report a few computational works addressing the notion of social identity. We explain the purpose of PSYMDEV, its functioning and its overall structure, before presenting the modeling of the main components involved in the system. We then focus on the conception of a categorization-situation that we illustrate thanks to the presentation of an example. Our conclusion ends the paper.

## THE PSYCHOLOGICAL THEORIES UNDERLYING PSYMDEV

### The Appraisal Theory

The basic question that motivated appraisal theories is why people react to the same things differently. Even if they live the same, or a similar situation, all people will react in slightly different ways depending on their perception of the situation. These perceptions elicit various emotions that are specific to each person.

Dating back to the 1940s and 1950s, Arnold wanted to “introduce the idea of emotion differentiation by postulating that emotions such as fear, anger, and excitement could be distinguished by different excitatory phenomena” (Arnold, 1954). For this purpose, she developed her “cognitive theory” in the 1960s, according to which, in an individual, an emotion starts with their appraisal of the current situation that arouses both the appropriate actions and the emotional experience itself, so that the physiological changes accompany, but do not initiate, the actions and experiences (Arnold, 1960).

Lazarus pursued research in the same direction as Arnold and tried to answer the following questions: what is the nature of appraisals which underlie separate emotional reactions and what are the determining antecedent conditions of these appraisals (Lazarus, Averill and Opton, 1970), (Lazarus, 1991). He distinguished two types of appraisals: the *primary appraisal*, directed at the establishment of the significance or meaning of the event to the individual in terms of its motivational relevance, and the *secondary appraisal*, directed at the assessment of the individual’s ability to cope with the consequences of the event.

On the basis of those pioneering works, Scherer finally succeeded in developing a consensual theory of emotion. The Appraisal Theory of Emotions (Scherer, Schorr, and Johnstone, 2001) postulates that the emotion that a human being (or any living organism) experiences in a given situation, whether the latter is lived, imagined or remembered, results from the assessment of a few cognitive criteria that can be categorized into four families that answer the following questions: Is the situation relevant to me, does it affect my well-being? (*Relevancy*). What are the implications of the situation and how do they affect my well-being and my short-term and long-term goals? (*Implications*). To what extent can I face the situation or adjust to its consequences? (*Coping*). What is the significance of the situation as regards my social norms and my personal values? (*Normative Significance*). Scherer’s version of the appraisal theory includes 16 specific criteria that belong to the previous categories (Scherer, Schorr, and Johnstone, 2001). A combination of values of the criteria determines in a unique way a specific feeling, but the assessment of the different criteria is subjective. Thus, the same situation can trigger different emotions in people with different traits and coming from different cultures. Only the correspondence between a combination of values and a specific feeling is universal.

### The Social Identity Approach

The Social Identity Approach comprises both the Social Identity Theory and the Self-Categorization Theory (Tajfel and Turner, 2004). It addresses the ways in which people perceive and categorize the others and themselves. Individuals form self-conceptions that are based on a twofold identity: a personal or self identity, and a collective identity. Personal or self identity refers to our unique, personal qualities such as our personal beliefs, our abilities and skills, etc. The collective self includes all the qualities that arise from being part of a society, culture, family,

groups, clubs, etc. A distinction is made between people belonging to the same group(s) as us (the ingroup(s)) and people not belonging to it (them) (they belong to our outgroup(s)). Besides, individuals actually have multiple social identities that can be activated (that is, can become salient) and prevail over the others depending on the context within which they stand. For example, if you are a male professor, a father of three children and a supporter of the Lakers, in the context of a game of your favorite team, your identity as a supporter will be salient, whereas, in a professional context, your identity as a professor will prevail over the others and in a family context, your identity as a father will be the most important.

### The Intergroup Emotion Theory

The Intergroup Emotion Theory (Mackie, Devos, and Smith, 2000) suggests that the emotional experience of a person as a member of a group is identical to the experience they live as an individual, as it is described in the Appraisal Theory. The only difference is that the Intergroup Emotion Theory implies the cognitive evaluation of a situation that concerns the social identity of an individual (traits that connect the person to social groups) instead of involving their personal identity (the aspects that make the person unique). According to Scherer and Garcia-Prieto (Garcia-Prieto and Scherer, 2006), the criteria that are sensitive to the social identity of a person are the ones that have a social connotation like the conduciveness/obstructiveness, the causal agency, the responsibility, the control, power and adaptability and the compatibility with the social norms of the group(s) the person belongs to (Sander and Scherer, 2009). Moreover, the feeling triggered depends on the strength of the identification of a person with their social group(s). Table 1 shows the extension of Scherer’s appraisal dimensions to the intergroup level.

The different assessment criteria mentioned in this table answer the following questions :

- **Goal conduciveness/obstructiveness:** Does this situation constitute an obstacle to my goal as a member of my ingroup(s) or does it facilitate it?
- **Causal agency:** Who is responsible for the failure or the success of this situation?
- **Responsibility:** What is the intentionality?
- **Control:** Does(do) my ingroup(s) control the consequences of the situation?
- **Power:** Does(do) my ingroup(s) have any power in the context of this situation?
- **Adaptability:** Will my ingroup(s) adapt to the consequences of this situation?
- **Normative significance:** Is this situation in accordance with the standards of my ingroup(s) (norms and values)?

Table 1 : Extension of Scherer’s appraisal dimensions to the intergroup level (Garcia-Prieto and Scherer, 2006)

Appraisal dimension	Propositions for the interpersonal context	Propositions for the intergroup context
	Self vs. other	When a social identity is salient Ingroup vs. outgroup
<b>Implication assessment</b>		
<b>Goal conduciveness/obstructiveness</b>	Likely to be appraised in terms of personal goals	Likely to be appraised in terms of salient ingroup’s goals
<b>Causal agency</b>	Likely to be appraised in terms of the self in relation to other(s) interpersonally	Likely to be appraised in terms of the salient ingroup in relation to the target outgroup
<b>Responsibility</b>		
<b>Coping potential</b>	Likely to be appraised in terms of personal control, power and adaptability in regards to the consequences of the event	Likely to be appraised in terms of the salient ingroup’s control, power and adaptability in regards to the consequences of the event
<b>Determination</b>		
<b>Control</b>		
<b>Power</b>		
<b>Adaptability</b>		
<b>Normative significance</b>	Likely to be appraised in terms of general social norms	Likely to be appraised in terms of salient ingroup’s norms
<b>Evaluation</b>		
<b>External standards</b>		

### The Common Ingroup Identity Model

Within the framework of the Social Identity Theory, individuals are characterized by their social and cultural

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identity involving a set of external and internal traits, behaviors, beliefs, values, goals that are crucial for the assessments they make about a given situation. The Social Categorization Theory affirms that people show favoritism towards members of their ingroup(s) compared to those of their outgroup(s). Conversely, they are inclined to prejudice and discrimination towards their outgroup members. The goal of the Common Ingroup Identity Model is to reduce intergroup conflicts by reducing this bias. The idea is to modify in people the perception of their ingroup(s) and outgroup(s) by modifying their categorization. That way, people that were classified as outgroup members will be reclassified as ingroup members (Dovidio et al., 2006), (Crisp and Hewstone, 2007). The solution that has been proposed is to induce the perception of a common ingroup which is achieved by increasing the salience of an existing common superordinate membership (e.g. a school, a company, a nation) or by making salient new elements that redefine group relations (e.g. common goals or shared fate). Identities are thus assumed to be structured within a hierarchy of specialization.

More specifically, according to Crisp (Crisp and Hewstone, 2007), the three best possible strategies to reduce the bias between two groups with their respective identities, are:

- If both identities have a common superordinate identity, the stress must be put on the salience of this identity, but without erasing the salience of the subordinate identities. As a matter of fact, for some type of strong identities like race or for minority groups, the bias may be increased instead of decreased due to the fact that the subordinate groups may feel that their own identity is threatened (Sander and Scherer, 2009).
- If there is no superordinate identity, an alternative is to have both groups collaborating on a common task, with an equal status and towards a common goal (strategy inspired by Allport (Allport, 1954)).
- Yet another option can be to decategorize people and then to avoid intergroup bias, by having members of both groups interact individually with each other and no longer as members of their respective groups.

## NOTION OF SALIENCE OF A SOCIAL IDENTITY

The salience of a social identity is determined by its *accessibility* and its *situational fit* (Turner et al., 1987). The *accessibility* of an identity is defined as the easiness or the spontaneity with which this identity is recalled. The *situational fit* is the extent to which a particular context activates an identity (Kopecky, Bos, and Greenberg, 2010). The *accessibility* of an identity for an individual partially depends on the past experiences of the person, on their expectations and present motives, on their values, goals and needs, but some social identities are naturally more accessible whatever the individuals (e.g. professional status as regards marital status). Besides, some identities are permanent like ethnic group, others are flexible like political opinion. On the other hand, the subjective identification of an individual to their ingroup identity plays a crucial role in determining the accessibility of this individual to their identity.

The *situational fit* has two aspects: the *comparative (structural) fit* and the *normative fit*.

- The *comparative fit* is based on the MetaContrast Principle that defines the fit in terms of the emergence of the sharpness of a category (an identity) on a contrasting background. Let's imagine the following situation: you attend a basket-ball game, Boston Celtics vs. Chicago Bulls. In the audience that stands on the bleachers of the stadium, you catch sight of several people that wear Boston Celtics' supporter T-shirts, while most of the others wear Chicago Bulls' supporter T-shirt or a neutral jersey. Given that you wear a Boston Celtics' supporter T-shirt, you self-categorize yourself as such and you see the people wearing a Chicago Bulls' jersey as an outgroup.

Among a group of individuals, people who look alike tend to stand out among the other people, thus allowing their categorization and the activation of the corresponding self-categorization.

- The *normative fit* refers to the fact that for an individual to categorize spontaneously people into a social group, the people must behave in accordance with the typical way the members of the group are expected to behave. They must conform to the expectations an individual has concerning their external appearance and their behavior, the latter being even more important than the external appearance. Let's take the following example. You are in a railway station. Among the crowd, you catch sight of several people wearing very formal clothes, while most of the others wear

informal clothes. Wearing yourself used jeans and a T-shirt, you categorize yourself among the careless people and view the strict ones as an outgroup. All of a sudden, there's an argument between the ticket seller, who is a black person, and a female customer. The latter pronounces a racist insult. Among the witnesses, some, regardless of their clothing, take sides for the ticket seller and others for the lady. Your anti-racist identity then becomes salient and you take sides for the ticket seller. It's then this last identity that dictates your behaviors. It has become salient all the more easily that it is important in your eyes (much more than an identity in terms of clothing). You then consider the members of the racist group as similar to each other, although they wear different clothes and this all the more easily that they conform to the image you have about the members of this social category.

## **SOCIAL IDENTITY MODELING**

Few models focus on the computational representation of social identities, (Kopecky, Bos, and Greenberg, 2010). The *Simulate Cultural Identities for Predicting Reactions to events* (SCIIPR) model, concentrates on political opinions as flexible identities. It uses a simple social network of influence. The Salzarulo's *MetaContrast* model illustrates the phenomenon of discrimination as defined in Turner's theoretical approach to self-categorization. This model shows how polarization and extremism can occur due to the combination of attraction to ingroups and repulsion of outgroups. The *Political-Science Identity* (PS-I) model aims at establishing a link between permanent identities like cultural identity and flexible identities like political identity to merge geographic clusters. Finally, the *Social Identity Look-Ahead Simulation* (SILAS) model is dedicated to permanent and flexible identities like ethnical, political and religious memberships. The authors attempt to determine how internal conflicts between identities may be solved by modeling common enemy dynamics.

Thus, all these models have the advantage to highlight the dynamic character of social identification. However, they present some lacks, because they fail at investigating carefully enough a crucial characteristic of social identities, namely their salience. In particular, none of these models proposes a faithful representation of the notion of situational fit.

## **PURPOSE AND PRESENTATION OF PSYMDEV**

In the context of asymmetric conflicts where the Armed Forces must intervene, they need to make the local population an ally. For that purpose, they spread out psychological messages to generate the desired thoughts, feelings and behaviors in members of the population selected by social criteria like age or educational level (the *info-targets*). PSYMDEV aims at helping the military analyst construct messages that trigger in the info-targets specific feelings directed towards another social group (the *aim-group*, that may be identical to the info-target group) like anger or fear or absolute feelings like despair or boredom. The inputs of the system are, on the one hand, the info-targets and possibly the aim-group, that are characterized by their respective values for social criteria like age, gender, social status, etc., and, on the other hand, a feeling that the info-targets must feel. This feeling is directed towards the aim group if it is specified. The output of the system is a twofold-situation described by means of a *categorization-situation* and an *action-situation* that will induce the feeling in the info-targets. These situations are illustrated by means of images or a film or some auditive elements, thanks to adapted media generally used by the military like tracts or video clips, for example. Therefore, the twofold-situation gives birth to a psychological message. The process that will trigger the feeling comprises two steps.

### **First Step of the Process**

The first step of the process consists in inducing a positive or a negative initial state of mind in the info-targets depending on the type of feeling to be triggered. The underlying psychological mechanism is based on the Social Categorization Approach. Indeed, as we showed in the section devoted to this approach, people tend to show favoritism towards the members of their ingroup(s) and to feel prejudice towards the members of their outgroup(s). So, if the feeling to trigger is positive, the idea is to shape the perception of the info-targets in order for the aim-group to be considered as an ingroup. For that purpose, making salient the common social identities that both group share or in the absence of such identities, highlighting a common goal or fate for both social groups, will induce the

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impression of belonging to a common ingroup and will then imply a positive bias from the info-targets towards the aim-group. This strategy stems from the Common Ingroup Identity Model. It is the purpose of the categorization-situation to highlight the salience of the relevant social identities. This salience must be expressed through their normative and their structural fit. Thus, the categorization-situation of a twofold situation must include representatives of the aim-group and possibly the info-target group having the typical appearance and behavior of their respective relevant identities (normative fit). The salience of the concerned identities is also increased by introducing in the categorization-situation a contrasting background (structural fit). If the feeling to trigger is negative, conversely, the perception of the info-targets must be shaped in order for them to consider the aim-group as an outgroup and to feel prejudice towards it. For this purpose, the categorization-situation will outline for both groups the social identities they don't share with each other. If such identities don't exist, the identities of both groups will be equally salient and no initial state of mind is induced prior to the triggering of the specific feeling that will be achieved by the action-situation directly.

## **Second Step of the Process**

The second step of the process aims at effectively triggering the concerned specific feeling. The underlying idea comes from the Appraisal Theory of Emotions and the Intergroup Emotion Theory: through the evoking, by means of the action-situation, of a situation that the info-targets will assess as members of their social group, they will feel a feeling corresponding to the result of this appraisal. Indeed, the Appraisal Theory clearly mentions that a situation needs not be lived, but may only be imagined or remembered for individuals to assess it and feel the corresponding feeling. Actually, the Intergroup Emotion Theory is used in the reverse order. The feeling to be triggered, that is given as an input to the system, determines a set of values for the assessment criteria and the system designs the action-situation so that its characteristics match the values of the assessment criteria. For example, if the assessment of the criterion « the action matches the values of the social group of the info-targets » is positive, then the action performed in the action-situation must respect those values. The action-situation designed that way should then trigger the proper feeling in the info-targets.

In this paper, we will focus only on the first step that we will described in detail in the following sections.

## **Overall Structure of the System PSYMDEV**

Figure 1 presents the overall structure of the system PSYMDEV.

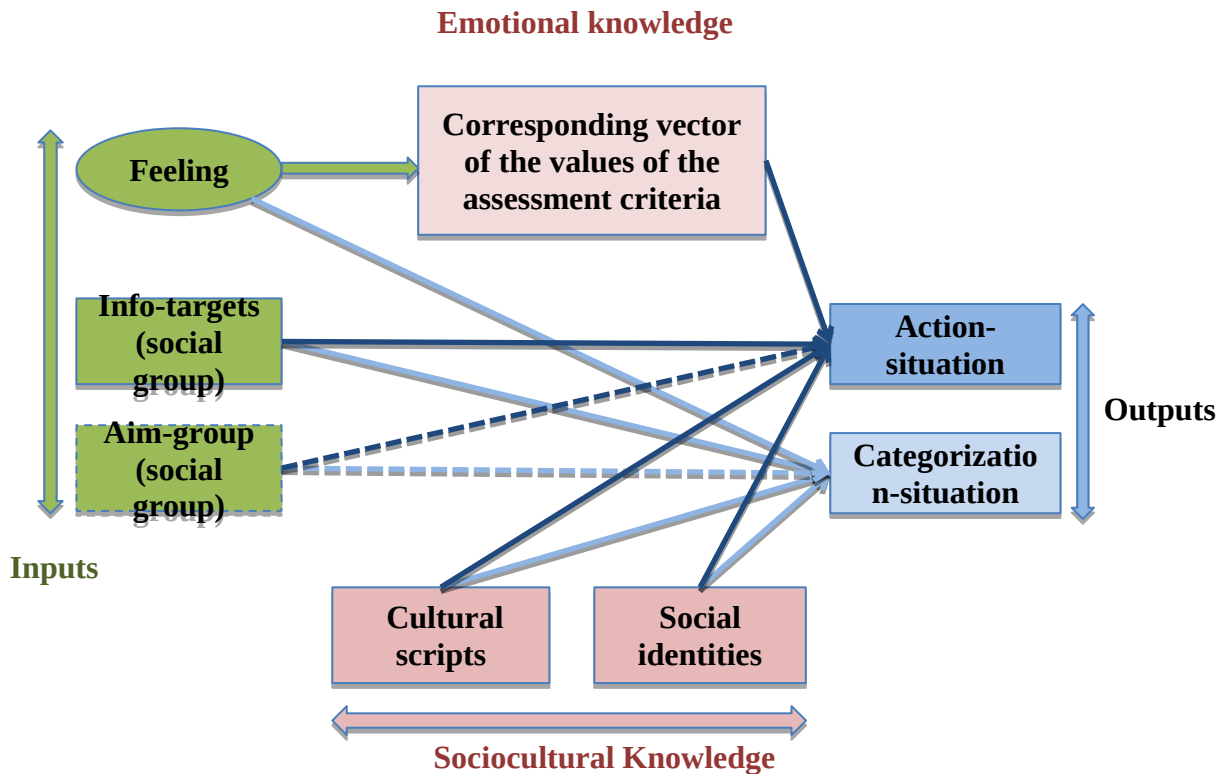


Figure 1. Overall structure of the system PSYMDEV

## DESCRIPTION OF PSYMDEV COMPONENTS

### Emotional Knowledge

We previously mentioned that, according to the Appraisal Theory, situations are assessed along 4 dimensions: Relevancy, Implications, Coping and Normative Significance. In the context of the Intergroup Emotion Theory, there is no need to assess the relevancy of a situation, because our purpose is to conceive a situation that is relevant to the info-targets. So we focus on the assessment criteria that belong to the three other families. Like the other components of the system, feelings are described using a frame-based representation (Minsky 1975). Given the assessment criteria shown in table 1, a feeling is an instance of **frame Feeling** defined by: slot **Conduciveness/Obstructiveness**, slot **Causal agency**, slot **Responsibility**, slot **Control**, slot **Power**, slot **Adaptability**, slot **Normative significance**. Slot Conduciveness/Obstructiveness can take the values “obstruction”, “facilitation” or “open”. Slot Causal agency can take the values “ingroup”, “outgroup”, “nature”, “open”. Slot Responsibility can take the values “intentional”, “chance”, “open”. Slot Control, Power, Adaptability and Normative significance can take the values “very high”, “high”, “medium”, “low”, “very low”.

### Social Groups

Social groups are defined along 12 different dimensions or *social criteria*: age ( $c_1$ ), gender ( $c_2$ ), professional status ( $c_3$ ), ethnic group ( $c_4$ ), religion ( $c_5$ ), political opinion ( $c_6$ ), location ( $c_7$ ), social status ( $c_8$ ), educational level ( $c_9$ ),

marital status ( $c_{10}$ ), parental status ( $c_{11}$ ) and language ( $c_{12}$ ). Each social criterion has a set of possible values:  $V_1, V_2, V_3, V_4, V_5, V_6, V_7, V_8, V_9, V_{10}, V_{11}$  and  $V_{12}$ .

A given social group may have an undefined value for one or more criteria. Let  $G$  be a social group,

$G=(v_1, v_2, \dots, v_{11}, v_{12})$ , means that criterion  $c_i$  has an undefined value for social group  $G$ .

We define the set of social criteria:  $C=\{c_1, c_2, \dots, c_{11}, c_{12}\}$ . For each social criterion,  $c_i$ ,  $V_i$  is structured hierarchically so that, let  $G_{v_1}$  and  $G_{v_2}$  be the sets of the members of the social group defined respectively by value  $v_1$  and value  $v_2$  for criterion  $c_i$  if  $v_1 \ll v_2$  ( $v_2$  is an ancestor of  $v_1$ ), then  $G_{v_1} \subset G_{v_2}$ .

A social group is described as an instance of frame **Social-group** defined by the following slots : **Age, Gender, Professional-status, Ethnic-group, Religion, Political-Opinion, Location, Social-status, Educational-level, Marital-status, Parental-status, Language**. The possible values of these slots depend on the culture and the country that constitute the framework within which PSYMDEV is used.

## Sociocultural Knowledge

### Social Identities

Each value of one of the 12 social criteria mentioned previously is defined as an instance of Social-Identity frame that represents the concept of social identity and is described by means of the following slots:

- **Label (L):** value of the social criterion (e.g. “old” associated with criterion Age or “Muslim” associated with criterion Religion),
- **Criterion (C):** name of the associated criterion (e.g. Age or Religion),
- **Appearance (A):** describes clothes and accessories worn by an individual having this social identity,
- **Values (V):** (e.g. honesty, friendship, etc.),
- **Norms (N):** describes typical behaviors (i.e. holding books, writing on a blackboard, etc.), ways of speaking relative to the identity. Not only characteristics of an individual that require vision are taken into account. Audible characteristics are also mentioned. Indeed, depending on the medium that will be used by the military analyst to convey their message, audible and visual features may be used to illustrate a situation. For instance, if, via loudspeakers, the analyst wants to describe a situation involving an old man, it’s his voice that will help the listeners to categorize him as such.
- **Goals (G):** Maslow’s Pyramid (Maslow, 1943) represents a hierarchy of goals, in the framework of the Theory of Human Motivation, that remained popular for a long time. However, most scientists nowadays reject this model, because it has been studied only for western populations. In other models of society, it is not relevant, that’s why we chose to elaborate a hierarchy of goals that depends on sociocultural characteristics. For each specific identity, we have defined a hierarchy that determines which goals are important to this identity and what are their respective priorities.

We use Schank’s classification of goals: Satisfaction Goals (SG), Enjoyment Goals (EG), Achievement Goals (AG), Preservation Goals (PG), Crisis Goals (CG), Instrumental Goals (IG) and Delta-Goals (DG), (Schank, 1977). Instrumental Goals and Delta-Goals will appear in the framework of the representation of situations, because they actually are pragmatic sub-goals used for reaching the other goals of higher level.

A social identity can also be defined by the conjunction of the values of several criteria taken together (e.g. a married Muslim male). In most cases, the frame that represents this compound identity is not mentioned explicitly, because the respective values of slots Appearance, Values, Norms and Goals of the different identities add up to form the compound identity. However, it may happen that the compound identity has to be defined explicitly:

- If the previous slots have contentious values between the different identities;
- If the compound identity has not quite the same semantics as the conjunction of the original identities (e.g. a Jewish mother has their own characteristics that neither a Jewish, nor a mother has) or there are additional values for the previous slots that are not coming from the individual identities.

Social identities relative to each social criterion are also organized within two hierarchies :

- a hierarchy of specialization: for most criteria like Political opinion or Religion, for example, their values, that is the corresponding social identities, can be ordered hierarchically. For instance, social identities relative to the criterion Religion can be ordered as « monotheistic religion » and « polytheistic religion », then « monotheistic religion » can be specialized into « christianism », « judaism », « islam », etc.

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- a hierarchy that relies on power: minority social groups as regards to a given criterion are situated lower in such a hierarchy than majority social groups. For example, it is the case for small communities speaking a particular language within a country whose official language is different.

## Goals

The goals associated with a social identity are organized within a hierarchy including all types of goals. At the top of such a hierarchy are situated high-level goals like Satisfaction Goals or Achievement Goals whereas at the bottom of the hierarchy are situated pragmatic goals like Instrumental Goals and Delta-Goals. These hierarchies may be multiple-inheritance hierarchies, that is, an Instrumental Goal can be a sub-goal of different higher-level goals.

## Situations

In PSYMDEV, we have defined a base of cultural scripts. A script describes a temporal sequence of scenes or situations (Schank and Abelson, 1977) relative to a global event like « going to the restaurant », « visiting friends » or « voting for the elections », etc. This kind of scripts is indeed cultural in the sense that the different scenes composing them may vary across countries and cultures. Cultural scripts are classified in different categories depending on the context within which they take place. There are 5 contexts, the *family context*, the *professional context*, the *educational context*, the *political context* and the *religious context* that respectively highlight the following sets of social criteria, marital status, parental status, gender, ethnic group and age, professional status and social status, educational level, political opinion and religion. In other words, each context allows to make salient the corresponding social identities.

We model two kinds of action-situations: those that depict situations that must trigger in the info-targets feelings that are not directed towards other people (absolute feelings) like boredom or happiness and situations that must trigger feelings felt towards another social group (directed feelings). In this paper, we will focus on the latter. Among them, we distinguish three types of situations:

- SAGIT situations, where the aim-group is directly responsible for the info-targets' feeling, because the latter are the target of an aim-group's action. Both groups must then be actors of such a situation.
- SAG situations, where the aim-group is acting in such a way that the info-targets experience the feeling, but the action is not made directly against them. Only the aim-group is then acting in this kind of situation. The cause of the feeling is then at least partially due to the fact that the action goes against the info-targets' values, goals or norms.
- COM situations, where both groups are collaborating on a common task with an equal status and a common goal.

We saw previously that the categorization-situation aims at making salient relevant social identities in the aim-group and the info-targets. So such a situation depicts representatives of those groups dressed and acting in accordance with their social identities to be made salient. To design a categorization-situation, the social identities to be made salient are first determined, then the context that corresponds to these identities is chosen as well as scripts defined within this context. We won't detail in this paper how a possible action-situation is determined from such a script, but as we will see, it takes place in a location and a period of time mentioned in the script. So does the associated categorization-situation.

A twofold-situation is represented by a frame that includes a *categorization-situation* and an *action-situation* and the common components of these situations, in particular the period of time and the location where both situations are taking place as well as the info-targets and the aim-group.

**Frame Twofold-situation** is then described by the following slots: slot **Salient-Aim-Group-Identities** and slot **Salient-Info-targets-Identities** which mention the social identities to be made salient respectively in the Aim-group and in the Info-targets, slot **Type-of-feeling** that specifies the type of feeling to be triggered by the twofold-situation (absolute or directed feeling), slot **Type-of-situation** which mentions the fact that the action-situation is a SAGIT, SAG or COM situation, slot **Context** whose values are Family, Professional, etc., slot **Categorization-situation** and slot **Action-situation** which mention the corresponding instances of frames Categorization-situation and Action-situation (see below), slot **Info-targets** and slot **Aim-group** whose values are social groups, slot **Location** (whose value is « downtown », for example), slot **Period** (whose value is « election-time », for example).

**Frame Categorization-situation** is described by: slot **Info-targets' behavior** and slot **Aim-group's behavior**

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whose values are typical behaviors of the social identity(ies) to be made salient for each social group (values of slot *Norms* for these social identities), slot *Info-target's appearance* and *Aim-group's appearance* (values of slot *Appearance* for these social identities).

**Frame Action-situation** is described by slot *Action-agent*: the agent of the action (the Aim-group), slot *Action-target*, this slot may be empty if the Info-targets are not involved in the situation, slot *Attendees*: possibly a social group whose role is merely to provide a contrasting background, slot *Action*: an action typical of the agent's identity(ies) in the specific context of the situation and slot *Goal* which mentions the goal pursued in the framework of the situation. The values of the latter are pragmatic goals that specifically concern the described Action-situation. These goals correspond to Instrumental and Delta Goals and must be achieved to reach the other more general goals mentioned in the representation of social identities seen previously. The specialization hierarchies specific to social identities including all the types of goals they pursue (that we saw in the section describing the components of the system) are modeled aside from the frames representing the social identities and the Action-situations.

We can notice that Instrumental Goals mentioned in the description of an Action-situation are objective and concrete, but the linking to higher-level goals depends on the goal hierarchies proper to each social identity. In other words, the interpretation of an Action-situation in terms of high-level goals is specific to each observer as a member of a social group characterized by several social identities.

We won't detail the description of actions, that is not relevant during PSYMDEV's first step. Roughly, there is a correspondence between their characteristics and the values of the assessment criteria that define the feeling to be triggered.

## CONCEPTION OF CATEGORIZATION-SITUATIONS

### Which Social Identities to Be Made Salient in a Categorization-situation?

Let  $G_{it}$  and  $G_{ag}$  be respectively the info-targets and the aim-group:  $G_{it} = (v_1, v_2, \dots, v_{12})$ ,  $G_{ag} = (v'_1, v'_2, \dots, v'_{12})$ . Let define a social identity  $si_{ij}=(c_i, v_{ij})$  and the predicate  $Salient(s, si)$  that means "situation  $s$  makes salient social identity  $si$ ". Let  $Sit$  be the Categorization-situation to be generated.

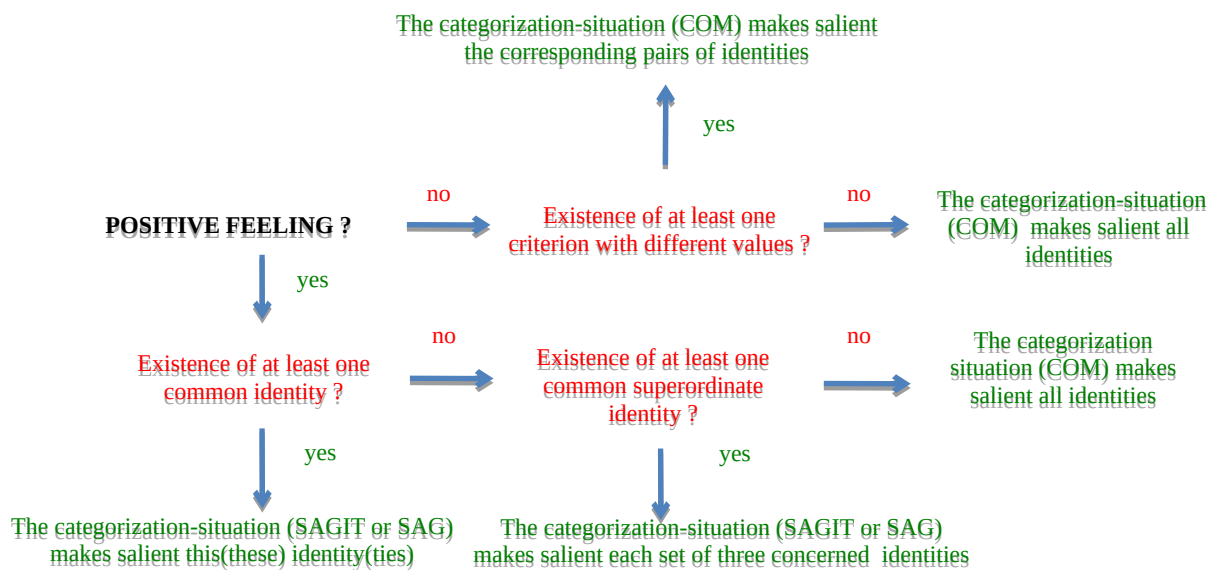


Figure 2. Determination of the salient social identities in a categorization-situation

## How to Express the Salience of Social Identities?

In a previous section, we showed that the salience of an identity in a given situation is determined by its accessibility and its situational fit. An identity must be salient for a social group globally, so we cannot take into account the specific characteristics of an individual that make an identity more or less salient in their eyes, nor can we change the natural accessibility of an identity. So, we only have to put the stress on both components of the situational fit of a social identity in a given situation to make it salient: the *structural fit* and the *normative fit*.

In every case, the representative(s) of the aim-group and the possible representative(s) of the info-target group must have the external appearance and the behaviors corresponding to the typical values of their respective salient social identity(ies), to maximize the *normative fit*.

As for maximizing the structural fit, the idea is to emphasize the relevant social identity(ies) thanks to a contrasting background. Whatever the kind of feeling to be triggered, positive or negative, two cases may occur:

- the stress must be put on common identities between the identity(ies) of the info-target group and the aim-group (SAGIT situation) or on the identities of the aim-group (SAG situation). We then merely have to add in the categorization-situation of the twofold-situation, a social group in slot Attendees which has one or several identities consisting of a criterion whose value is identical for both groups, with a value that differs from the common value, to create a contrasting background.

- the stress must be put on identities that differ in the info-target group and the aim-group, then there is no need to create a contrasting background in a SAGIT or a COM situation, as the contrast is brought to each group by the presence of the other one in the categorization-situation. If it is a SAG situation, a social group with identities contrasting with those of the aim-group must be added in slot *Attendees*.

## AN EXAMPLE ILLUSTRATING A FEW CASES

The context is Egypt a few months after the arrest of ex-president Muhammad Morsi. The info-targets are the social group SG<sub>it</sub> consisting of married parent males, aged over 25, Egyptian, Muslim, pro-Morsi, living in Egypt, and speaking Arabic. The aim-group is the social group SG<sub>ag</sub> consisting of married parent males, aged over 25, military, Egyptian, Muslim, Anti-Morsi, living in Egypt and speaking Arabic.

SG<sub>it</sub>=(over-25, male, 0, Egyptian, Islam, Pro-Morsi, Egypt, 0, 0, married, parent, Arabic)

SG<sub>ag</sub>=(over-25, male, Military, Egyptian, Islam, Anti- Morsi, Egypt, 0, 0, married, parent, Arabic).

Different social identities are defined, for instance (we use previous abbreviations).

Appearance, values, norms, goals

**Pro-Morsi** (L: Pro-Morsi, C: Political Identity, A: civilian clothes, V: Justice, Freedom of expression, Democracy, N: to shout slogans, to carry Morsi's portraits, G: (AG, to restore Morsi's duties), (IG, to demonstrate))

**Muslim** (L: Muslim, C: Religion, V: Family, Fraternity, N: to pray as a body, to give money or food to poorer than oneself, G: (AG, to achieve one's Muslim duties), (IG, to pray at the mosque, to attend the Friday preaching, to fulfill the charity for the poorest (zakat)))

**Egyptian** (L: Egyptian, C: Ethnic Group, V: Sharing, Honor, Respect, N: to offer bed and board, to offer a present when invited)

**Egyptian male** (L: (Egyptian, Male), C: (Ethnic Group, Gender), N: to support financially one's family, to make the

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important decisions, G: (AG, to marry, to have a family, to have a good job, to be respected, to have good relationships with others), (PG, to maintain a good harmony within one's family, to take care of one's family, to perpetuate traditions))

**Military** (L: Military Forces (Anti-Morsi), C: Professional status, A: soldier-clothes, V: Order, N: to watch, to supervise the civilians, G: to maintain order)

In the categorization-situation, all the representatives of the identities that must be salient have to conform to their respective typical appearance and norms and must be highlighted by a contrasting background.

• If the feeling is positive:

The common identities: over-25, male, Egyptian, Islam, Egypt, married, parent and speaking Arabic must be made salient.

- either a situation within the Family Context: it can be a SAGIT situation: in this case, it pictures an individual from the Aim-Group, a soldier, over 25, with his wife and children, speaking Arabic, who is invited for dinner in the house of an individual from the Info-Target group, who is over 25, with his wife and children, who speaks Arabic, and the soldier brings a trinket (norm: to offer a present when invited). It can be a SAG situation: in this case, a soldier is present, putting on his uniform to go working and talking to his wife and children (norm: men work to support financially their family).

- or a situation in the Religious Context: SAGIT or SAG situation: a group of soldiers (Aim-group) are patrolling near a mosque (norm: to watch, to supervise). The representatives of slot *Attendees* value are civilians.

• If the feeling is negative:

The identities that differ between both groups: no specified professional status vs. military, pro-Morsi vs. anti-Morsi must be made salient. The chosen context is then the Political Context: SAGIT or SAG situation: demonstrators are walking in the streets of an Egyptian city (norm: to shout slogans, to carry Morsi's portraits), military are present.

## CONCLUSION

In this paper, we have described the functioning and the overall structure of the system PSYMDEV that aims at helping a military analyst to conceive psychological messages. Given a specific feeling to be triggered in the info-targets towards an aim-group, PSYMDEV generates a twofold-situation that must induce this feeling. We have then focused on the first step of the system. Our work has been influenced by some existing computational tools that deal with culture, like the Upper Ontology of Culture (UOC, (Blanchard, Mizoguchi, and Lajoie 2011)), the Target Audience Simulation Kit (TASK, (Taylor et al. 2010)) and other works from the Soar Technology Laboratory (Taylor et al. 2007). The UOC project focuses on the conceptualization of three culture-related domains: models of cognitive domain, affective domain and context. UOC provides guidelines for cultural systems to ensure their interoperability. The TASK system goal is the same as ours: developing effective messages, but in a marketing context. Both tools, UOC and TASK, use the Appraisal Theory for modeling the emotion process. Our system takes its originality from the fact that the Appraisal Theory is interpreted in an intergroup context thanks to the Intergroup Emotion Theory. Moreover, the system uses this theory in the reverse order and comprises a previous step that aims at inducing a positive or negative state of mind in the info-targets depending on the feeling to be triggered.

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