MEDIATED COMMUNICATIONS IN EXTREME ISOLATION. A. SOLIGNAC[1], [1]Laboratory of Applied Psychology, Reims, France – amaurysolignac@hotmail.com.

Introduction: Prolonged and voluntary isolation can be found in space stations, polar stations and raids, but also in remote military and commercial outposts and ships, such as oil rigs, submarines, and the navy at large. In these settings, the unusual experience of being "alone together" [1] has been studied through the observation of direct interpersonal relations (such as conversation and social activities), under the scope of group dynamics [2], and to predict both individual and collective adaptation.

Some social and psychological aspects of a 500 days scientific campaign to Meridiani Planum could thus be partly predicted from analog situations and simulations. However, and despite reliable communication means, highly unusual space and time isolation scales are to be experienced by the crew of a Martian expedition. Communications between Mars and the Earth are delayed by several minutes: technical, scientific, medical and affective support remain distant in space and in time, in a way quite similar to the early oceanic and polar expeditions.

Mediated communications (i.e. using a technical medium such as radio) within subgroups under heavy confinement and with the outside world would then play an important role towards the crew members' performance and adaptation.

Cognitive aspects: Even in extreme settings of isolation, modern technologies allow for indirect communication through text, voice, still and animated images. But these various media have a significant influence on one's perception of messages, interlocutors and context.

Delayed and mediated cognitions. Delayed communications are cognitively very different from direct interpersonal and "live" mediated ones, as they happen in distinct time frames for the emitter and receiver of the message. Of similar importance is the type of information conveyed by the medium of communication used. Table 1 presents a generic list of communication modes involved in mediated human interaction. Rich media may convey more complex information, including emotional cues and messages. One may consider information other than linguistic to be a source of interference, but even technical messages may be harder to understand when emotional information is not available.

Task-oriented efficiency. Alternatively, one could consider the effectiveness of a communication medium to be specific to the task involved [3]. Some tasks indeed require unsophisticated communications in order to eliminate all interfering information ("go/no go"), while other activities benefit from redundant information provided by visual or auditory cues ("we have a problem"). According to this hypothesis, maximizing information flows might not always be the best strategy, nor would the constant use of simplistic codes. This is of particular importance to the efficiency of technical and scientific field operations, where a balance between quality and quantity of data is sought.

The study of media specificity is also a prerequirement to the design of appropriate medical and psychological support, a particular type of communication.

TABLE 1 – COMMUNICATION MODES AS A FUNCTION OF MEDIA [3]

Mode	Face to face	Video	Audio	Computer teletype
Proxemic (distancing or placement)	X			
Kinesic (facial expression and gestures)	X	X		
Paralinguistic (amplitude, rate, and tenor of speech)	X	X	X	
Linguistic (written or spoken word)	X	X	X	X

Psychological aspects: The type and quantity of communication sessions necessary to maintain a psychologically satisfying relation with distant interlocutors in official or personal communications depends on individual and collective preferences and habits [4], with possible cultural variations [5]. In isolated settings, one may consider frequent communication sessions to be emotionally uncomfortable or even stressful ("too close for comfort"), whereas another person would need such communications to happen regularly, up to several times a day.

Emotional distance. Each communication medium has highly subjective advantages and disadvantages that one can use to create or preserve some distance between oneself and the rest of the world: between one's immediate environment and a distant –mediated–

environment. Such a distance –of a psychological and symbolic nature– is useful to keep the outside world and its own stressors away from the thoughts of the isolated crewmember. The outside communication rates of a French Antarctic base have indeed been found to drop significantly around the middle of winter, when both arrival and departure are farthest in time, and when outside events are hardest to cope with [4].

Negative affects. Similarly, the extent to which one feels negatively isolated from distant peers or networks relates to outside communications patterns. Palinkas [Palinkas] observed how long duration isolation influenced American winterers' perception of distant sources of social support. Even when the structure of the social network remained constant (family, friends, official support and intra-crew support), its quality was perceived as lower at the end of the stay.

Although long awaited conversations with close ones may bring joy to the member of an isolated crew, some communication sessions may also bring depressive feelings and uneasiness for a while [6,7], or even frequent anxiety towards family problems, unresolved or irresolvable. This aspect is of direct importance to the psychological adaptation of an isolated Mars expedition: on site –as it may be adverse to performance and safety– and upon return to Earth.

Psychosocial aspects: Conversations and technical exchange with Earth are a unique alternative to communication with crew members under extreme confinement. However, the strong link between ground and crew –or from a wider point of view between "center" and "outpost"– can sometimes be severely damaged (see SKYLAB-4 and [8] for examples in space: mistakes by both the crew and the control center must be acknowledged to understand tension rises and voluntary communication disruptions). As often experienced in polar settings, groups tend to be naturally self-centered, and react according to their own reference [9]. In space settings, the displacement of negative emotions from the crew towards ground control has been studied in manned space vessels such as Mir, the Space Shuttle and the ISS [10,8,11], along with the processes of information retention and "psychological closure" of the crew [12].

According to Gushin, the feeling of competency of isolated crews may grow in time, to the point where external advices are distrusted, and the crew reaches an "autonomy of communication" [8]. Recommendations have been made to consider the emotional aspects of the ground/crew interactions, and mission controllers as well as astronauts and cosmonauts are trained on this matter.

Organizational level: A 500-day campaign would certainly require a comprehensive layout for crew/Earth interactions. A space station in Low Earth Orbit is close enough for live telemetry and videoconference, and allows for a quick if not comfortable evacuation. A Mars base may also provide telemetry, but with much weaker reactivity than a Moon base, and no evacuation at all. It is obvious that a Meridiani-type campaign should allow for several communications between the Earth and the crew: technical guidance, scientific backrooms, telemedicine (including psychological support and possible monitoring data) and, last but not least, personal communications with family and friends. Motorized exploration would also require a great amount of technical and non-technical intra-crew mobile communications between the base and scouting parties.

All these communications would be a function of available means, activities layout, and crew compositions. They would also, in return, refine the layout of activities and determine group dynamics between ground, base and raid subgroups.

Prospective: The cognitive, psychological and psychosocial nature of Earth-Base/Earth-Raid delayed communications –and that of Base-Raid direct communications– could fruitfully be studied in analog settings, such as remote polar bases and raids willing to simulate Earth-Mars transmission delays.

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