### CURRENT RESEARCH IN SOCIAL PSYCHOLOGY

http://www.uiowa.edu/~grpproc/crisp/crisp.html

Submitted: August 20, 2010 First Revision: October 21, 2010 Accepted: December1, 2010

### SOCIAL AFFILIATION AS A WAY TO SOCIALLY REGULATE EMOTIONS: EFFECTS OF OTHERS' SITUATIONAL AND EMOTIONAL SIMILARITIES

Tanguy Leroy Véronique Christophe\* Gérald Delelis Marjolaine Corbeil Jean-Louis Nandrino Université Lille Nord de France – Université Lille 3 – URECA EA 1059 (France) \* is also affiliated to the Maison Européenne des Sciences de l'Homme et de la Société USR CNRS 3185 (France)

### ABSTRACT

To consider social affiliation as an emotion regulation strategy raises the question of the distinct roles of the situational and emotional similarities of a potential partner. In study 1, 46 female participants briefly described a personal event of a low or high negative intensity. They then had the opportunity to either remain alone or to affiliate with another person, who either supposedly participated in the same experiment (situational similarity) or did not. In the same task, the 48 female participants of study 2 had the opportunity to be alone or with another person, who either supposedly experienced the same emotions (emotional similarity) or did not. The results showed that situational and emotional similarities increased affiliation. We discuss the potential personal and social benefits of these two similarities to individuals who experience an emotion and, more globally, we discuss the role of social affiliation in emotion regulation.

#### **INTRODUCTION**

Emotions generally promote individuals' adaptation to situations (Frijda, 1986, 1988; Oatley & Johnson-Laird, 1987). Nevertheless, at times, people may attempt to "influence which emotions they have, when they have them, and how these emotions are experienced and expressed" (Gross, Richards, & John, 2006). Emotion regulation thus refers to any cognitive, physiological, or motor process that modifies the nature, intensity, and/or dynamics of emotional responses (Gross & Thompson, 2007). An adaptive emotion regulation requires people to use strategies that are processed either alone (emotion self-regulation; e.g., cognitive reappraisal of the

situation, breath control) or during social interactions (social emotion regulation; e.g., social comparison, mutual distraction).

Social emotion regulation strategies may be carried out only when people get in contact with another individual, that is, when they affiliate. Any social approach behavior that allows for the initiation or maintenance of social interactions can be considered an affiliative behavior. Social affiliation thus refers to behaviors such as the reduction in the physical distance from others, postural orientation towards others, looks at others, and any verbal or non-verbal behaviors (facial expressions, gestures) that initiate or maintain visual, physical, and/or verbal contact with another (see Cottrell & Epley, 1977; Delelis, 2002; Kulik & Mahler, 2000). The notion that social affiliation may be involved in emotion regulation appeared in Schachter's seminal work (1959) on the motives of social affiliation in anxiety-producing situations. What remains unclear is how, and under what conditions social affiliation contributes to emotion regulation.

For a given individual, the psychological and emotional consequences of social interactions may differ according to the affiliation partner, and as a result of the satisfaction or dissatisfaction felt during the present or a past social interaction (Christophe & Di Giacomo, 2003). It is thus of interest to understand the social determinants that govern individuals' choice of whether or not to affiliate when they experience emotional situations. Addressing this issue should inform us about the interpersonal emotion regulation strategies that people may employ – in addition to self-regulation strategies – to cope with challenging situations.

According to Rofé's utility theory (1984), individuals affiliate when they perceive that this behavior is more beneficial than detrimental, depending upon their own characteristics, those of the situation, and those of their potential target of affiliation. The choice of an affiliation partner is not due to chance (Delelis, 2004; Derlega, Harris, & Chaikin, 1973) but depends on many individual (e.g., behavioral tendency to use others as a support for coping activities; social learning), social (e.g., good or bad social models, but also identity, link and status of others who are possible targets of affiliation), emotional (e.g., valence, intensity, order) and situational determinants.

Among the benefits people receive from social affiliation, one may be the opportunity it provides to use interpersonal emotion regulation strategies to cope with challenging events. First, contacting another individual may allow mutual distraction (Schachter, 1959), that is, the focus of one's attention on anything but the emotional situation. From this point of view, individuals who desire distraction should prefer to affiliate with a partner who does not face the same emotional situation (*situational dissimilarity*). Second, uncertainty about a situation induces stress: social affiliation partners may enable individuals to regulate this stress by clarifying the ambiguous and stressful situation. A cognitive clarification of the situation (Kulik & Mahler, 2000) may result from the exchange of information about the situation. Contrary to distraction, the cognitive clarification is more efficient when the partner is facing or has faced a similar situation (*situational similarity*). Third, when individuals face an ambiguous and threatening situation, they may feel an undifferentiated emotional activation that must be interpreted so as to verify whether it is appropriate to the situation (see Schachter, 1964). Then, according to Schachter (1959, see also Festinger, 1954), the individuals attempt to end their emotional uncertainty by affiliating and comparing their emotions with peers who are experiencing a

similar emotional plight, that is, who seem to be in a similar situation (*situational similarity*) and to have similar emotional responses (*emotional similarity*).

Schachter (1959) confirmed the situational similarity hypothesis. However, others have shown that the nature and characteristics of the emotion at hand and the specific emotional activation can have quite opposite consequences on the immediate affiliative tendency (see Cottrell & Epley, 1977; Delelis, 2002; Sarnoff & Zimbardo, 1961; Teichman, 1973).

Moreover, although they have been largely intertwined in the literature, situational similarity and emotional similarity are not perfectly dependent on each other. One cannot expect people in the same situation to experience similar emotions as environmental and social contingencies, as well as social learning, shape the emotional reactions to a stimulus (Delelis, 2002; Gross & John, 2003; Lazarus, 1991; Rofé, 1984). As a consequence, situational similarity does not systematically involve emotional similarity. Moreover, others' emotional similarity helps to specify their situational similarity, but it is informative only when the situational similarity is genuine. Yet, few tests of the emotional similarity hypothesis have been conducted and their results remain unclear.

Accordingly, the aim of the present studies is to distinctly assess the effects of situational and emotional similarities on social affiliation in a negative emotional situation. We first predict that emotion will increase individuals' affiliative tendency because of their need to socially regulate the induced emotion (studies 1 & 2). Second, we postulate that the situational similarity of a potential affiliation target will also increase affiliation tendencies in an emotional situation because of the emotion regulation benefits people may receive from exchanging information about the situation (study 1). Finally, according to Schachter's theory of emotional social comparison (1959), we expect an individual's affiliation tendencies to increase when the potential partner displays emotional similarity in a similar emotional situation (study 2).

# STUDY 1: IMPACT OF A PARTNER'S SITUATIONAL SIMILARITY ON SOCIAL AFFILIATION

### **Participants**

Forty-six unpaid female students (aged 17 to 31 years, M = 20.0, SD = 2.3) volunteered to participate in this study. They were recruited in the hall and cafeteria of the university and were randomly assigned to one of the four experimental conditions of the study (low *vs.* high emotional narrative x situational similarity *vs.* dissimilarity of the potential affiliation target).

### Procedure

A female psychologist experimenter met the participants in the laboratory. The fictitious aim of the study was to examine the transmission modes of communication in the media. The research was presented as being conducted in two parts; the first one consisted of a five-minute personal narrative. The experimenter instructed participants to retrieve from their memories and briefly describe an event of high (a personal, recent and upsetting emotional event) or low (a typical and neutral day at the university) emotional intensity. In line with other studies (Zech & Rimé, 2005),

the first condition has been found to induce more disturbance, sadness, anger, shame, embarrassment and less amusement than the second condition (Leroy, Delelis, Corbeil, Nandrino, & Christophe, 2005). After their narrative, participants were told that, for material reasons, they had to wait for a few minutes in an adjacent room before the second part of the study. They were informed that another female student was waiting in one of the available rooms and that she was confronted with either a similar (taking part in the same experiment) or a dissimilar situation (waiting for an appointment with a professor). No additional information was provided about this potential affiliation target. Participants then stated whether they preferred to wait for five minutes alone in another room or in the company of this person (affiliation tendency).

### Results

The proportion of participants who chose to affiliate did not depend on whether the emotional situation was high (52.2%, n = 12) or low in intensity (56.5%, n = 13), F(1,42) < 1. However, in accordance with the situational similarity hypothesis, participants affiliated more often in the similar (75.0%, n = 18) than in the dissimilar situation condition (31.8%, n = 7), F(1, 42) = 9.71 (p < .01). The effect of situational similarity did not differ by the emotional intensity of the narrative, F(1, 42) < 1.

# STUDY 2: IMPACT OF A PARTNER'S EMOTIONAL SIMILARITY ON SOCIAL AFFILIATION

### **Participants**

Forty-eight unpaid female students (aged 18 to 32 years, M = 19.6, SD = 2.3) volunteered to participate in this study. Similar to study 1, they were recruited in the hall and cafeteria of the university and were randomly assigned to one of the four experimental conditions (low *vs.* high emotional narrative x emotional similarity *vs.* dissimilarity of the potential affiliation target).

### **Procedure and Material**

The procedure was identical to that of study 1, except that electrodes were placed on the participants' hands at the beginning of the experiment, supposedly to measure their emotional responses during a communication activity. These electrodes helped us to manipulate the supposed emotional similarity of the participants: after the narrative, the experimenter printed a document that showed the participants' emotional reactions during their narrative. Then, the participants were informed that another female student was waiting in the next room, that she had already participated in the first part of the study, and that, according to the physiological recordings, she had felt emotions during her own narrative that were either similar or dissimilar to those of the participant. Similar to study 1, the participants who preferred to wait in the company of this peer rather than alone were considered to affiliate.

### Results

The participants did not choose to affiliate more often in the high (75.0%, n = 18) than in the low intensity emotional situation (79.2%, n = 19), F(1,44) < 1. Moreover, the participants who had the possibility to wait in the company of another person who was in a similar emotional state affiliated more often (87.5%, n = 21) than those who could wait with someone who was in a dissimilar emotional state (66.7%, n = 16), F(1, 44) = 2.89 (p < .05). Finally, the effect of emotional similarity did not differ by the intensity of the emotional situation, F(1, 44) < 1.

#### **GENERAL DISCUSSION**

We first hypothesized that intense emotional narratives would increase participants' affiliative tendencies (Buck & Parke, 1972; Darley, 1966) because social affiliation offers the opportunity to implement social emotion regulation strategies. Surprisingly, the participants' affiliative tendency was not modified by the emotional intensity of the narrative in either of the two studies. This result reminds that the effect of emotional intensity on social affiliation described in a great deal of literature is not systematic and strongly depends on the characteristics of the emotional situation. Indeed, previous studies have found that intense emotional situations sometimes decrease the likeliness of affiliation but in most of the cases, increase it (Gump & Kulik, 1997; Latané & Wheeler, 1966; Schachter, 1959; for a review, see Delelis, 2002). At least two complementary explanations of the results of the current studies can be suggested.

First, emotions, emotion regulation strategies and *motives* to affiliate likely depend on whether they take place before (proactive affiliation/regulation) or after an emotional situation (reactive affiliation/regulation). For example, before the event, people may seek (proactive) cognitive clarification of the situation whereas after the event, they may be more likely to seek (reactive) social sharing of their emotions (so as to receive social support, reassurance, valorization, etc.). In our two studies, the lack of information about the fictitious second part of the research may have been a stressor that impacted the choice to affiliate more than the emotions induced by the narratives themselves. Since this stressor was the same for all of the participants, regardless of how emotionally intense their narrative had been, the *need* for proactive emotion regulation (so, affiliative tendencies) may have been the same for all participants. This would explain the lack of effect of the emotional intensity of the narratives. This interpretation raises the point of a possible interference between proactive and reactive emotion regulation processes, the former appearing to be more decisive for immediate adaptive functioning than the latter. This issue must be investigated further as it may be a particularly interesting way to understand emotion regulation regulation processes.

Second, contrary to classical studies, emotions induced in our studies were endogenous (they had a psychological, internal origin: personal self-report in link with a personal event) rather than exogenous (external origin such as electric shocks, reduced blood pressure, painful injection). Methods for regulating endogenous emotions may not be the same as methods for regulating exogenous emotions. Indeed, one may assume that, because of their internal origin, endogenous emotions may lead people to implement more self-focused self-regulation strategies. On the contrary, as their origin can be witnessed by others, exogenous emotions may more likely lead to the use of externally/socially focused interpersonal regulation strategies. Emotional intensity may thus have less of an effect on social emotion regulation processes (so, on social affiliation) when emotions are endogenous rather than exogenous.

We also hypothesized that affiliation tendencies induced by emotions would be directed preferentially towards people who were facing the same situation and who were reacting to the situation with similar emotions (for reviews, see Collins & Miller, 1994; Kulik & Mahler, 2000). Regardless of emotional intensity, study 1 confirmed that people prefer affiliation targets who are facing the same situation and study 2 showed that emotional similarity increases affiliation tendencies as well. Thus, the best affiliation target seems to be someone who is experiencing or has experienced both the same situation and similar emotions. This observation confirms most of the results reported in the relevant literature (see Delelis, 2002; Kulik & Mahler, 2000). The findings of the current study are not consistent with the hypothesis that people affiliate in order to distract but they comply with the assumption that social affiliation in emotional situations may be driven (among other things) by the needs for cognitive clarification of the situation (see Kulik & Mahler, 2000) and social comparison of emotions (Schachter, 1959).

According to the emotional social comparison theory (Schachter, 1959), one could assume that when all is already known about another individual's emotional reactions, there would be no reason to seek his or her presence (Gerard & Rabbie, 1961). Our results do not validate such an assumption. Indeed, affiliation rates remain high in the case of situational similarity regardless of the information people receive about their potential partner's emotional state (similar, dissimilar, study 2; no information, study 1). This result is consistent with the hypothesis that the possibility of implementing cognitive clarification is one of the benefits that people may seek when they affiliate. Indeed, when individuals know that another person did not experience the same feelings (or have no information about this) despite a similar context, social affiliation may remain informative to point out what may have been differently perceived and felt in the situation. This may help people learn how others cope with the same situation, allowing them to better predict others' future behaviors and to promote their own future adaptation to challenging situations.

Surprisingly and contrary to other observations (Darley, 1966; Gump & Kulik, 1997), situational and emotional similarities lead to affiliation even when the emotional intensity is low. Regardless of their emotional state and emotion regulation needs, people perceive benefits of affiliating with peers who share or have shared a similar experience or similar feelings. Similarity may be a source of pertinent information as well as a guarantee of a pleasant, or at least not a detrimental, social interaction (Rofé, 1984). It is informative because it enables one to gain (objective or subjective) control of the situation and the emotional disturbance, based on the advice of others. It also allows individuals to compare their reactions with the emotional display and behavioral social norms of other people (see also Skowronski, Gibbons, Vogl, & Walker, 2004), and to find a consensual manner to feel and behave in the future. It decreases the need for ulterior information and thus enhances future emotion regulations. It also promotes social adaptation and emotional convergence (Anderson & Keltner, 2004; Anderson, Keltner, & John, 2003; Hill, 1987, 1991), and thus, social integration.

Finally, a striking characteristic appears when simultaneously observing the affiliation rates presented in studies 1 and 2. In the case of situational dissimilarity, the affiliations are less numerous than in all other conditions. Therefore, the question may need to move away from the role of similarity and search for similarity in the affiliative tendency to that of their absence. While similarity in general is known as a powerful factor of global interpersonal attraction (for

instance, see Berscheid & Reis, 1998), little is known about dissimilarity and its potential role in social regulation. In other words, a challenging question for future investigations is whether a dissimilarity leads to social isolation or to a reduction in the willingness to affiliate. The results of such a study would likely depend on the characteristics of the individuals and especially on their *will* to approach or to avoid emotions. Indeed, the situational dissimilarity context is likely the most uncomfortable condition for individuals who seek an emotional approach and who, therefore, need to regulate their emotions by exchanging information about an emotional event in their life. On the contrary, dissimilarity is likely the most convenient for people who seek emotional avoidance (Rofé & Lewin, 1986) and distraction. This issue may have particularly important implications for the institutional, social or familial management of situations linked to coping with, for example, a chronic pathology, a clinical surgery or the announcement of a pathological condition (see Kulik & Mahler, 2000).

In conclusion, we believe that it is necessary to dissociate emotional and situational similarities to understand their effects on individuals' affiliative behaviors, and thus to qualify the actual role of social affiliation in emotion regulation. Future research should examine the information concerning the role and consequences of the search for others' emotional and/or situational similarity/dissimilarity on emotional experiences, emotion regulation and social adjustment. Our results appear to suggest that the emotions felt by others are important when addressing such issues. Besides, one can expect that, due to display rules (Ekman & Friesen, 1975), social affiliation may depend on the emotions that the potential partners express. These questions must be investigated further. Finally, one promising lead would be to analyze real social interactions following emotional situations in order to shed light upon that which is expressed by individuals and the emotion regulation strategies that are used. This may aid in discovering the motives and personal/social consequences of social affiliation as well as the roles of social affiliation in emotion regulation.

### REFERENCES

Anderson, C., & Keltner, D. (2004). The emotional convergence hypothesis. Implications for individuals, relationships, and cultures. In L. Z. Tiedens & C. W. Leach (Eds.), *The social life of emotions* (pp. 144-163). Cambridge: Cambridge University Press.

Anderson, C., Keltner, D., & John, O. P. (2003). Emotional convergence between people over time. Journal of Personality and Social Psychology, 84, 1054-1068. Berscheid, E., & Reis, H. T. (1998). Attraction and close relationships. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (4th ed., vol. 2, pp. 193-281). New York: McGraw Hill.

Buck, R. W., & Parke, R. D. (1972). Behavioral and physiological response to the presence of a friendly or neutral person in two types of stressful situations. *Journal of Personality and Social Psychology*, *24*, 143-153.

Christophe, V., & Di Giacomo, J-P. (2003). Est-il toujours bénéfique de parler de ses expériences émotionnelles ? Rôle du partenaire dans les situations de partage social des émotions [Is it always beneficial to talk about one's emotional experiences? Partner's role in the situations

of social sharing of emotions]. *Revue Internationale de Psychologie Sociale/International Review of Social Psychology, 16,* 99-124.

Collins, N. L., & Miller, L. C. (1994). Self-disclosure and liking: A meta-analytic review. *Psychological Bulletin*, *116*, 457-475.

Cottrell, N. B., & Epley, S. W. (1977). Affiliation, social comparison, and socially mediated stress reduction. In J. M. Suls & R. L. Miller (Eds.), *Social comparison processes* (pp. 43-68). New York: Halsted Press.

Darley, J. M. (1966). Fear and social comparison as determinants of conformity behavior. *Journal of Personality and Social Psychology*, *4*, 73-78.

Delelis, G. (2002). Emotions et interactions sociales. L'affiliation et l'isolement comme modes de régulation personnelle et sociale [Emotions and social interactions. Affiliation and isolation as modes of personal and social regulation]. Unpublished PhD Thesis. University of Lille 3, France.

Delelis, G. (2004). Emotions et interactions sociales : Relecture critique [Emotions and social interactions. A critical reading]. *Bulletin de Psychologie*, *57*, 157-164.

Derlega, V. J., Harris, M. S., & Chaikin, A. L. (1973). Self-disclosure reciprocity, liking, and the deviant. *Journal of Experimental Social Psychology*, *9*, 277-284.

Ekman, P., & Friesen, W. V. (1975). Unmasking the face. Englewood Cliffs, N.J.: Prentice-Hall.

Festinger, L. (1954). A theory of social comparison processes. Human Relations, 7, 117-140.

Frijda, N. H. (1986). The emotions. New York: Cambridge University Press.

Frijda, N. H. (1988). The laws of emotion. American Psychologist, 43, 349-358.

Gerard, H. B., & Rabbie, J. M. (1961). Fear and social comparison. *Journal of Abnormal and Social Psychology*, 62, 586-592.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85, 348-362.

Gross, J.J., Richards, J.M., & John, O.P. (2006). Emotion regulation in everyday life. In D.K. Snyder, J.A. Simpson, & J.N. Hughes (Eds.) *Emotion regulation in families: Pathways to dysfunction and health* (pp. 13-35). Washington DC: American Psychological Association.

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3-24). New York: Guilford Press.

Gump, B. B., & Kulik, J. A. (1997). Stress, affiliation, and emotional contagion. *Journal of Personality and Social Psychology*, 72, 305-319.

Hill, C. A. (1987). Affiliation motivation: People who need people... but in different ways. *Journal of Personality and Social Psychology*, *52*, 1008-1018.

Hill, C. A. (1991). Seeking emotional support: The influence of affiliative need and partner warmth. *Journal of Personality and Social Psychology*, *60*, 112-121.

Kulik, J. A., & Mahler, H. I. M. (2000). Social comparison, affiliation, and emotional contagion under threat. In J. M. Suls & L. Wheeler (Eds.), *Handbook of social comparison: Theory and research* (pp. 295-320). New York: Kluwer Academic/Plenum.

Latané, B., & Wheeler, L. (1966). Emotionality and reactions to disaster. *Journal of Experimental Social Psychology (suppl. 1.: Studies in Social Comparison)*, 95-102.

Lazarus, R. S. (1991). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist, 46*, 819-834.

Leroy, T., Delelis, G., Corbeil, M., Nandrino, J.L., & Christophe, V. (2005, June). Similarité situationnelle et similarité émotionnelle : effets sur le comportement affiliatif en situation émotionnelle [Situational similarity and emotional similarity: effects on affiliative behaviours in emotional situations]. *Paper presented at the 7ème Colloque des Jeunes Chercheurs en Psychologie Sociale*, Aix-en-Provence (France).

Oatley K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion*, *1*, 29-50.

Rofé, Y. (1984). Stress and affiliation: A utility theory. Psychological Review, 91, 235-250.

Rofé, Y., & Lewin, I. (1986). Affiliation in an unavoidable stressful situation – An examination of the utility-theory. *British Journal of Social Psychology*, 25, 119-127.

Sarnoff, I., & Zimbardo, P. G. (1961). Anxiety, fear, and social affiliation. *Journal of Abnormal and Social Psychology*, 62, 356-363.

Schachter, S. (1959). *The psychology of affiliation. Experimental studies of the sources of gregariousness*. Stanford: Stanford University Press.

Schachter, S. (1964). The interaction of cognitive and physiological determinants of emotional state. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (vol. 1, pp. 49-80). New York: Academic Press.

Skowronski, J. J., Gibbons, J. A., Vogl, R. J., & Walker, W. R. (2004). The effect of social disclosure on the intensity of affect provoked by autobiographical memories. *Self and Identity*, *3*, 285-309.

Teichman, Y. (1973). Emotional arousal and affiliation. *Journal of Experimental Social Psychology*, *9*, 591-605.

Zech, E., & Rimé, B. (2005). Is talking about an emotional experience helpful? Effects on emotional recovery and perceived benefits. *Clinical Psychology & Psychotherapy*, *12*, 270-287.

### **AUTHOR BIOGRAPHIES**

Tanguy Leroy is a postdoctoral researcher in social and health psychology at Lille 3 University. His research interests include the links between interpersonal relationships and emotion regulation, both from a fundamental and from an applied to health points of view. Email: tanguy.leroy@univ-lille3.fr

Véronique Christophe is an Associate Professor of social psychology at Lille 3 University, and a member of the French Northern Cancer Center steering committee. She conducts studies dealing with emotion regulation, emotional communication, interpersonal relationships, health prevention, health education, and quality of life in patients with chronic illness. Email: veronique.christophe@univ-lille3.fr

Gérald Delelis is an Associate Professor of social psychology at Lille 3 University. His research interests include emotion and social regulations, emotional communication, dynamics of emotional relationships in people with chronic illness, impacts of stereotypes and intergroup behaviours on emotions and coping. Email: gerald.delelis@univ-lille3.fr

Marjolaine Corbeil is a psychologist at Lille University Hospital. She is interested in emotional communication in patients with chronic illness or familial deleterious genetic mutations. Email: <u>m-corbeil@chru-lille.fr</u>

Jean-Louis Nandrino is Professor of psychopathology at Lille 3 University. His research-deals with emotional processes troubles, depression, addictions, family psychology and psychotherapy, and dynamic systems. Email: jean-louis.nandrino@univ-lille3.fr