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Quantifying the dynamics of emotional expressions in family therapy of patients with anorexia nervosa

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ABSTRACT

Emotional interactions have been considered dynamical processes involved in the affective life of humans and their disturbances may induce mental disorders. Most studies of emotional interactions have focused on dyadic behaviors or self-reports of emotional states but neglected the dynamical processes involved in family therapy. The main objective of this study is to quantify the dynamics of emotional expressions and their changes using the family therapy of patients with anorexia nervosa as an example. Nonlinear methods characterize the variability of the dynamics at the level of the whole therapeutic system and reciprocal influence between the participants during family therapy. Results show that the variability of the dynamics is higher at the end of the therapy than at the beginning. The reciprocal influences between therapist and each member of the family and between mother and patient decrease with the course of family therapy. Our results support the development of new interpersonal strategies of emotion regulation during family therapy. The quantification of emotional dynamics can help understanding the emotional processes underlying psychopathology and evaluating quantitatively the changes achieved by the therapeutic intervention.

1. Introduction

Emotional interactions have been considered temporal sequences of emotional expressions involved in initiating, maintaining, and changing emotional states in interpersonal relationships (Fitness and Duffield, 2004). Because of their inherent temporal dimension, emotional interactions can thus be characterized as dynamical processes (Kuppens et al., 2009). This emotional dynamics is fundamental in the affective life of humans from parental to romantic love and constitute the basis of affective development (Gottman et al., 2002). Thus, understanding the nature and processes underlying emotional dynamics remains one of the most important challenges in the study of emotions in interpersonal relationships (Lewis, 2005).

The paradigmatic situations where emotional interactions have been studied are dyadic ones such as couples, mother-baby or patient-therapist interactions. In such dyadic examples, emotional interactions have been modeled using dynamical systems theory (Liebovitch et al., 2011; Bielczyk et al., 2012), which has also been used in empirical studies (Gottman et al., 2002; Granic and Patterson, 2006; Rapp et al., 2011). These studies have shown that dynamical systems theory is a suitable framework for the study of emotional interactions in psychopathology and psychotherapy (Bornas et al., 2014; Doba et al., 2007). Nevertheless, these results are limited to dyadic interactions (Kyselo and Tschacher, 2014) and cannot easily be generalized to systems composed of more than two individuals, such as the important case of families.

Family psychology usually assesses changes in communication behavior but is less interested in measuring changes in emotional states (Olson, 2000). However, with the development of new approaches such as "emotionally focused therapy", clinicians and researchers have concentrated on emotional experiences and the sharing of these experiences (Dolhanty and Greenberg, 2009). The quality and pattern of emotional interactions have been related to the healthy adjustment of families and disturbances of these interactions considered factors involved in the development of distress and pathological familial situations (Fitness and Duffield, 2004; LeGrange et al., 2011). Consequently, some studies have dealt with the characterization of emotional interactions in families and revealed the dependence of

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emotional behaviors between family members (Allen et al., 2012; Granic and Patterson, 2006). Nevertheless, these studies mainly involved descriptions of emotional interactions based on self-reports introducing an appraisal of the emotion in addition to its experience. The main challenge for family psychology is to develop methods able to quantify the dynamics of emotional interactions in family systems based directly on the expression of the emotions. These methods would allow to describe how novel forms of organization emerge and stabilize according to the transitions of family life cycle, psychological disorders or family therapy (Granic and Patterson, 2006; Pincus, 2001). Such quantifications could constitute a new way to evaluate the efficiency of therapeutical designs involving several individuals.

Family therapy was developed to cope with pathological situations and is a standardized environment adapted to the study of the emotional interactions in family systems. A number of empirical studies have demonstrated its efficacy for a wide range of psychological disorders (Cottrel, 2003; Eisler et al., 2000). The central framework of systemic family therapy is the analogy between families and complex adaptive systems (Bateson, 1972; Van Geert and Lichtwarck-Aschoff, 2005) where families are considered through their dynamical characteristics including their ability to self-organize, self-regulate through feedback, and to evolve with time in a nonlinear way (Van Geert and Lichtwarck-Aschoff, 2005). From this point of view, each member of the family contributes to the emergence of the collective dynamics but is also influenced by the retro-action of the collective dynamics on herself/himself. Thus family therapy mainly targets modification of the interactions between members of the family which may lead to individual changes through top-down feedbacks (Eisler et al., 2007; Doba et al., 2013).

The present empirical study goes beyond a metaphorical description of family functioning by using methods developed within the framework of complex systems (Nicolis and Nicolis, 2012). It quantifies the collective dynamics of emotional expressions in therapeutic system including family members and therapist (Garden et al., 2006) and their individual interactions during family therapy. It is based on the direct observation of emotional expressions and focuses on the particular case of anorexia nervosa (AN). In fact, AN has an emotional impact on the life of patients and their families since symptoms exacerbate emotional reactions and specific behaviours which become progressively recurrent and lead eventually to rigid emotional patterns (Dare and Eisler, 1997; Eisler, 2005). These decreases of variability in emotional patterns would contribute to maintain eating symptoms (Minuchin, 1985; Eisler et al., 2000). Moreover, decreases in both emotional overinvolvement and negative interactions in the family of AN patients are significant clinical measures for therapeutic changes in family therapy and for improvement of eating symptoms (Eisler et al., 2007; Wallin and Kronvall, 2002; Robin et al., 1995). These results suggest that changes in emotional interactions in the family therapy of AN patients provide a paradigmatic situation for studying the emotional interactions in a system with more than two individuals.

We studied emotional interactions during a therapy session and their evolution throughout the therapy process using verbal and nonverbal emotional expressions in the parents, the patient with AN and the therapist. Two levels of interaction were taken into account: (i) the collective level of the whole therapeutic system i.e. family members and therapist, and (ii) the dyadic level. The main objectives of the study are:

- to propose an appropriate methodology to study the dynamics of emotional expressions during a session of family therapy in the whole therapeutic system,
- to quantify the emotional interaction between pairs of participants during a therapy session,
- to characterize the evolution of interactions in the therapeutic system throughout the therapy process.

2. Method

2.1. Participants

Participants were selected from the Addictology Department of the University Hospital (CHRU) of Lille (France). The experimental protocol and the participation of patients and their families were validated by the local ethical committee. This study has been carried out in accordance with the provisions of the World Medical Association Declaration of Helsinki.

During the amount of time devoted to the study (three years), twenty families were informed about the study. Seven were excluded before any data acquisition because of severe worsening of patient somatic status. The remaining thirteen families were included in the sample and participated in the study after giving informed consent. Three families stopped the family therapy after the first session and were thus discarded from data analysis.

The experimental sample was thus composed of ten intact nuclear families with a complete family therapy proceedings (Doba et al., 2013). They included the father (mean age: 49.4 Y.O., SD: 5.48), the mother (mean age: 49.3 Y.O., SD: 6.31) and the anorexic patient (mean age: 20 Y.O., SD: 2.27). Socioeconomic status of these families, classified according to parental's occupation, was: 50% from social classes I and II, 40% from social classes III and V and 10% from social classes from VI and VIII (Seys, 1984).

2.2. Patients' assessment

The female outpatients were selected according to the DSM-IV criteria for AN restrictive type, i.e., without the binge-eating and vomiting or laxative abuse of bulimics (American Psychiatric, 1994). Diagnostic assignment was determined by the consensual judgment of a psychiatrist and a clinical psychologist. Exclusion criteria were: neurological disorders, intellectual deficits and a recent history of drugs or alcohol abuse. Axis II of the DSM-IV related to personality disorders was not assessed. Anorexic patients had a Body Mass Index (BMI) ranging from 12.5 to 15.5 kg/m^2 (mean: 13.9, SD: 1.07) and their duration of illness ranged from 1 to 5 years (mean: 2.9, SD: 1.52). All patients received antidepressant drugs (serotoninergic agonists) and the same supportive medical care by psychiatrists and physicians. Participants were included at least three months after the beginning of the antidepressant treatment when mood is stabilized in order to minimize the effect of the treatment on emotional response (Flament et al., 2012).

The history of clinical manifestations as well as the psychosocial functioning of the patient were collected during semi-structured interviews (Morgan and Hayward, 1988). The Morgan and Hayward (1988) scales (MR scales) were used to rate the patients' nutritional status (MRnut), menstrual functioning (MRmens), mental state (MRment), psycho-sexual adjustment (MRpsex) and psychosocial adjustment (MRpsoc). The average of these five scores was used as an average outcome score (MRave) rating from 0 to 12 with 12 indicating normal functioning.

Individual assessments were conducted by a clinical psychologist independent of the family therapy. They were performed a week before the beginning and at the end of family therapy. The clinical evolution of patients with AN was assessed for the follow-up of brief strategic family therapy (BSFT) between first and last session using the BMI and scores to MR scales (five specific and their average). Data for these indices were summarized as median and minimum-maximum intervals. We reported weight and changes in weight using the Body Mass Index (BMI in kg/m^2).

2.3. Brief strategic family therapy

Brief strategic family therapy (BSFT) was conducted by the same