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Sensibilisation aux émotions et formation de représentations par biofeedback social : Une révision du modèle et ses implications cliniques

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Résumé

Peu différenciées à la naissance, les émotions deviendraient intelligibles en étant élevées à la conscience par le développement d'une sensibilité aux sensations internes accompagnant l'émotion, sa représentation et sa symbolisation (Gergely & Watson, 1996). La *théorie du miroir affectif-parental du biofeedback social* de Gergely & Watson (1996), poussée plus loin par Fonagy, Gergely, Jurist et Target (2002), explique comment une interaction de biofeedback social complexe, innée, et probablement implicite, s'établit entre parent et nouveau-né pour aider ce dernier à différencier les somatosensations accompagnant l'expérience d'une émotion, au travers d'un comportement parental de miroir. Le but de cette thèse est de réviser cette théorie, et plus particulièrement l'hypothèse du miroir « marqué » (markedness), qui serait **nécessaire** pour dissocier le miroir parental du parent, et permettre l'appropriation de son contenu informationnel par l'enfant. Ce processus de sensibilisation est conçu comme partie intégrante du travail de symbolisation des émotions chez les enfants autant que chez les adultes. Cependant, le miroir marqué se manifestant par une expression exagérée ou « voix de bébé » (motherese) nécessiterait l'utilisation par le thérapeute d'une « voix de patient » (therapese) (Fonagy, 2010) pour être appliqué à la psychothérapie adulte, une proposition difficile à soutenir. La révision examine comment la sensibilisation d'une émotion est accomplie : par un mécanisme d'internalisation nécessitant un miroir « marqué » ou par un mécanisme de détection de la contingence de l'enfant. Elle démontre que le détecteur de contingence du nouveau-né (d'un fonctionnement semblable au système d'entraînement par biofeedback pour adultes) est le médiateur des fonctions de sensibilisation, de représentation, et de symbolisation de la

sensation d'une émotion par ses processus de détection de la covariance-invariance, de la maximisation, et du contrôle contingent du miroir parental. Ces processus permettent à l'émotion de devenir consciente, que le miroir parental soit 'marqué' ou non. Le modèle révisé devient donc applicable à la thérapie des adultes. Une vignette clinique analysée à l'aide de la perspective du Boston Change Process Study Group sur le changement est utilisée pour contraster et illustrer les processus de sensibilisation et de symbolisation des émotions, et leur application à la psychothérapie adulte. Cette thèse considère les implications cliniques du nouveau modèle, et elle spécule sur les conséquences de difficultés parentales vis-à-vis de la disponibilité requise par les besoins de biofeedback social du nouveau-né, et sur les conséquences de traumatismes déconnectant des émotions déjà sensibilisées de leurs représentations. Finalement, elle suggère que le miroir sensible des émotions en thérapie puisse remédier à ces deux sortes de difficultés, et que le modèle puisse être utilisé concurremment à d'autres modèles du changement, en facilitant la génération d'états internes ressentis et symbolisés pouvant être utilisés pour communiquer avec soi-même et les autres pour la réparation de difficultés émotionnelles et relationnelles chez les enfants et les adultes.

Mots clés: émotion, sensibilisation, symbolisation, miroir de biofeedback social, somatosensation, soi.

Abstract

Undifferentiated at birth, emotions would become intelligible by being raised to consciousness through the development of sensitivity to the inner sensations accompanying the emotion, their representation and symbolization (Gergely & Watson, 1996). The social biofeedback theory of parental affect-mirroring of Gergely and Watson (1996), furthered by Fonagy, Gergely, Jurist and Target (2002), explains how these somatosensory signals are so important that a complex, probably implicit, and possibly innate social biofeedback interaction exists between caregiver and infant, where the latter learns to differentiate between emotions through the parent's mirroring of his emotion expression. The aim of this thesis is to revise this theory, and more precisely the 'markedness' hypothesis, which would be **necessary** to dissociate the parental mirroring from the parent and allow appropriation of its informational content as pertaining to the infant. The process of sensitization to these sensations is conceived to be integral to the symbolization of emotions in children and adults. However, 'motherese', the singsong prosody of markedness hypothesized to be necessary to foster successful social biofeedback interactions between caregivers and infants, requires that therapists use 'therapese' in the clinical setting (Fonagy, 2010), a proposition difficult to reconcile with the therapy of adults. The revision investigates whether the sensitization and symbolization of an emotion is accomplished through an internalization mechanism requiring the 'markedness' hypothesis, or solely through social biofeedback mechanisms based on infant contingency detection. It demonstrates that the infant's contingency detector (similarly to biofeedback training in adults) mediates the

functions of sensitization, representation, and symbolization of an emotion through its processes of covariance-invariance detection, maximization, and the contingent control of the parental mirroring. It allows the emotion to be raised to consciousness, with the help of the parental mirror, whether it is 'marked' or not. The revised model thus becomes applicable to the therapy of adults. A clinical vignette analyzed with the Boston Change Process Study Group's perspective on change is used to contrast and illustrate the processes of sensitization and representations of emotions, and their application in adult psychotherapy. The thesis considers the clinical implications of the new model and speculates on the consequences of parental difficulties with surrendering to the social biofeedback needs of the infant, and on the consequences of emotional trauma disconnecting sensitive emotion sensations from their representations. Finally, it suggest that both kinds of difficulties can be repaired through sensitive mirroring of emotions in therapy, and that the model might be used concurrently with other models of change, by facilitating the generation of felt and symbolized inner states that can be used for self and other communication in the repair of emotional and relational difficulties in children and adults.

Keywords: emotion, sensitization, symbolization, social biofeedback mirroring, somatosensation, self.

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Liste des abréviations

MAP : Miroir-affectif parental

PAM : Parental affective-mirroring

BFS : Modèle du biofeedback social

SBF : Social biofeedback model

À mes parents Lison et Jean-Marie, mes premiers miroirs.

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Chapitre 1 — Mise en contexte

Les émotions ont longtemps été considérées en opposition à la raison. Associées au féminin, elles ont été perçues comme pouvant nuire à l'individu et devant être contrôlées. Les « passions » devaient être subordonnées à la raison pour éviter le risque de possession dangereuse ouvrant la porte à toutes les violences ainsi qu'à la maladie mentale. En psychologie, les émotions ont été d'abord été comprises comme servant à l'appréciation de la vie, puisque « colorant » nos perceptions des évènements. Elles ont ensuite été appréhendées comme des états cognitifs parmi d'autres, comme les croyances et les désirs (Gergely & Watson, 1996), une position idéaliste tenant peu compte de la part incarnée ou somatosensorielle du ressenti émotionnel et de la pensée (Niedenthal, 2007). Plus récemment (Solms & Turnbull, 2002), des chercheurs en neuropsychologie considèrent maintenant l'émotion comme formant un sixième sens percevant le monde intérieur de l'individu. Une émotion portée à la conscience devient « le sentiment de l'émotion », signifie « voilà comment je me sens », et donne naissance au sentiment de soi (Damasio, 1999, p. 344). Elle aurait une fonction mentale non cognitive similaire à la motivation, puisqu'elle surgit des processus autonomes (Solms & Turnbull, 2002), et serait essentielle à la survie de l'individu. Pour Damasio (1999, 2010), une émotion est un signal sur l'état d'équilibre du milieu intérieur de l'individu, aussi connu sous le nom d'homéostasie. Basée sur des conclusions de recherches sur les lésions cérébrales et en neuroimagerie, cette perspective démontre que le cerveau est l'organe qui sert d'intermédiaire entre le monde intérieur de l'organisme et le monde extérieur, où il doit satisfaire ses besoins viscéraux d'homéostasie. Le monde interne fait référence aux processus autonomes responsables de la survie de l'organisme comme la respiration, la pression sanguine, le contrôle de la

température corporelle, entre autres. Un mauvais fonctionnement de ces processus pourrait rapidement provoquer la mort (Ekman, 2003). Le cerveau percevrait le monde intérieur de l'organisme *au travers* des émotions : « L'émotion diffère des autres modalités sensorielles simplement parce qu'elle est dirigée vers l'intérieur » (Solms & Turnbull, 2002, p. 106, notre traduction). Solms et Turnbull réfèrent aux émotions comme étant des signaux informant l'organisme sur sa situation personnelle et inconsciente en réaction à un évènement particulier : « Si un éclair et un coup de tonnerre provoquent en vous un sentiment de peur, ce n'est pas l'éclair et le tonnerre que vous percevez émotionnellement (vous les voyez et les entendez visuellement et auditivement); c'est votre *réponse viscérale* à ces évènements que vous ressentez émotionnellement. » (Solms & Turnbull, 2002, p.107, emphase ajoutée, notre traduction). L'émotion serait donc une perception de l'*état* du sujet, et non du monde objectal (Solms & Turnbull, 2002; emphase ajoutée). Damasio (1999) soutient cette perspective :

> Les émotions sont des ensembles compliqués de réponses chimiques et neuronales, qui forment une configuration; toutes les émotions ont telle ou telle sortes de rôle régulateur à jouer, contribuant d'une manière ou d'une autre à la *création de circonstances avantageuses* pour l'organisme qui manifeste le phénomène; les émotions ont *trait à* la vie d'un organisme, à son corps pour être précis, et leur rôle est d'aider l'organisme à se maintenir en vie (p. 59, italiques ajoutés)

Cette modalité sensorielle dirigée vers le monde intérieur de l'individu est différente des modalités sensorielles de la vision, de l'ouïe, du goût et de l'odorat, qui forment les systèmes sensoriels dits « spécialisés ». Les paramètres homéostatiques sont mesurés par

des récepteurs de sensations du système général de somatosensations. Ce système de perceptions sensorielles (parfois appelé le système de sensibilité du corps) est basé sur le système somatique du toucher, le seul n'ayant pas un organe de perception spécialisé. Cette modalité est en fait une version interne du toucher, puisqu'elle se manifeste par le déclenchement de récepteurs du toucher implantés dans le corps tout entier et dans les viscères, comme le système de la circulation sanguine, générant des somatosensations (Campbell & Reece, 2005). Ces sensations internes sont propres à l'expérience de chacune des différentes émotions : « La perception de l'information viscérale est vécue consciemment comme le ressenti de l'émotion » (Solms & Turnbull, 2002, p. 29, notre traduction). Damasio appelle « le protosoi » l'activation constante d'un groupe de neurones au cerveau formant une représentation primaire du milieu interne de l'ensemble du corps (Damasio, 1999, p. 344). Cette représentation neuronale du « soi » interne est durable et stable, car générée par les neurones responsables de paramètres homéostatiques qui doivent rester dans une mince fourchette de variabilité pour assurer la survie de l'individu, comme le taux d'oxygénation du sang, les battements du cœur, ou la pression sanguine. Ils sont donc en constante activation et ne se « taisent » qu'à la mort. La perception du monde interne de l'organisme, comme toutes les perceptions recueillies par les cinq sens orientés vers le « monde extérieur », provient de ces paramètres homéostatiques produisant l'activation d'un groupe de neurones au cerveau formant cette représentation neuronale primaire de l'émotion, ainsi que *de l'information sous forme d'une émotion qui voyage dans le corps chimiquement ou par voies nerveuses*, alliées ou non à de l'information parvenant des autres sens. L'émotion, cet événement dynamique neurochimique, *modifie le*

milieu interne et ce faisant *se transforme*. L'émotion ainsi modifiée devient recartographiée dans une autre zone du cerveau pour former une représentation secondaire. C'est cette seconde représentation de la même émotion qui, selon Damasio, représente « c'est ce qui m'arrive », et qui surtout, donnerait naissance au sentiment de soi, en raison de son incontournable autoréférence (Damasio, 1999). Cette représentation secondaire affectera à son tour le milieu interne de l'organisme et, poussé par les structures neuronales affectées à la surveillance de l'homéostasie, forcera l'individu vers un agir-ou-mourir homéostatique. Cette représentation secondaire peut être inconsciente ou être portée à la conscience (p. 189). L'émotion, et encore plus fortement la conscience de l'émotion, permettent une adaptation optimale de l'individu à son environnement :

> On pourrait s'étonner de la pertinence qu'il peut y avoir à discuter du rôle biologique des émotions dans un texte consacré à la question de la conscience. La pertinence devrait clairement apparaître désormais. Les émotions fournissent automatiquement à l'organisme des comportements orientés vers la survie. Dans des organismes équipés pour sentir les émotions, c'est-à-dire pour avoir des sentiments, les émotions ont également un impact sur l'esprit, tel qu'elles se présentent, dans le ici et le maintenant. Mais dans des organismes équipés d'une conscience, c'est-à-dire capables de savoir qu'ils ont des sentiments, c'est un autre niveau de régulation qui est atteint. La conscience permet aux sentiments d'être connus, et promeut ainsi l'impact de l'émotion de façon interne; elle permet à l'émotion d'imprégner le processus de pensée par l'entremise ***du sentiment***. En définitive, la conscience permet à n'importe quel objet d'être connu—pas seulement l'« objet » émotion—et,

> ce faisant, elle améliore la capacité de l'organisme à répondre de façon adaptée, en étant attentive aux besoins de l'organisme en question. Si l'émotion est consacrée à la survie d'un organisme, la conscience l'est également. (Damasio, 1999, p. 62, emphase ajoutée)

Développer un soi agentique, qui a la capacité de créer et suivre son propre projet pour rencontrer ses besoins, repose donc en bonne partie sur l'appropriation de l'émotion comme un signal vers le soi guidant l'action et l'expérience (Gergely & Watson, 1996), ainsi que sur la formation d'une représentation symbolique pouvant être portée à la conscience, qui permet la gestion de la vie affective comme étant une série d'évènements symboliques subjectifs rendant possible une communication avec soi-même et les autres (Fonagy, Gergely & Target, 2007; Fonagy, Target, Gergely, Allen & Bateman, 2003; Fonagy, 2003; Fonagy et al., 2002, Gergely & Watson, 1996). Arriver à discriminer entre les différentes sensations internes émergeant des processus autonome liés à l'expérience d'une émotion est donc primordial non seulement pour la survie de l'individu, mais aussi pour son équilibre physique et psychique. Chaque émotion provoque un agir différent sur l'environnement et une confusion face à l'information contenue dans l'expérience interne peut être lourde de conséquences personnelles et relationnelles. Sans parler de l'inconfort et de la douleur liés aux sensations internes associées à certaines émotions négatives ou positives trop intenses : la capacité de faire la différence entre les sensations des émotions et de les représenter permet de les moduler par l'action, par la communication, ou par la réflexion. Cependant, amener un processus autonome à la conscience, que ce soit dans le but de le réguler ou non, ne peut se faire par la simple volonté. Selon Gergely et Watson (1996), ces processus étant

normalement implicites, ils requièrent une « technique d'acquisition de régulation de soi » connue sous le nom de biofeedback. Par le truchement d'une série d'entraînements à l'aide d'une voie d'appréhension externe, cette technique retransmet les conditions présentes du processus autonome à un sens comme la vision et l'audition, et permet la détection de sensations internes et externes associées à l'expérience autonome dont les changements correspondent à ceux de la présentation visuelle et sonore, jusqu'à l'éventuelle acquisition du contrôle volontaire de la condition autonome sans l'aide de la voie externe (Nishimura, Wang, Nagase, Terada, Miyamoto, Tsukuma & Muro, 2007). Évidemment, l'expérience d'une émotion n'est pas difficile à détecter. Par contre, comme toutes les émotions font usage des récepteurs internes du toucher implantés dans les viscères, les différences dans la façon dont les catégories d'émotions activent ces récepteurs peuvent être subtiles. *Cependant, une enfant*[1] *ne naîtrait pas avec une perception différenciée des émotions* (Gergely & Watson, 1996, 1999; Fonagy et al., 2002). Elle aurait besoin d'une interaction spéciale avec un parent pour pouvoir développer la capacité de différencier entre les catégories d'émotions. Bien sûr, les nourrissons rencontrent une multitude de défis développementaux, et il est encore difficile pour les chercheurs du développement de l'enfant de savoir précisément comment et à quel âge un nourrisson commence à différencier les émotions pour les utiliser comme 'un signal vers le soi'. Le premier défi semble de pouvoir faire la différence entre le soi corporel et l'extérieur. Dès la naissance (moins de 18 heures après l'accouchement), les nouveau-nés ont la capacité de faire la

[1] Le féminin est employé dans le texte lorsque référant au nourrisson ou au thérapeute, alors que le masculin est utilisé en référence au parent ou au client. Ces formulations ne signifient aucunes différences entre les sexes.

différence entre ce qui provient de leur propre corps et ce qui provient de l'extérieur (Rochas & Hespos, 1997). Ils répondent d'une façon différente à une autostimulation d'une stimulation externe (un toucher sur la joue provenant de leur propre main ou de celle de quelqu'un d'autre) grâce à une capacité à capter les signaux proprioceptifs provenant de leur bras et de leur main, couplés à un signal de 'touché-double' (émanant de la stimulation de la peau de leur joue simultanément à celle de la peau de leur doigt qui touche leur joue) leur signalant leur 'soi écologique', qui réfère au corps comme étant différencié et agentique (Rochas & Hespos, 1997). Par contre, cette étude réfère à une différenciation du corps externe (peau) de l'environnement et non à une différenciation des signaux émotionnels internes du corps. Comme il est très difficile d'inférer si les nourrissons (1 à 24 mois) peuvent discriminer les signaux émotionnels internes, la plupart des études se penchent sur leur capacité de reconnaître les expressions émotionnelles chez les autres. Il est improbable qu'un nouveau-né puisse discriminer ses signaux internes, puisque selon Widen et Russell (2008), les nourrissons de moins de 10 mois d'âge ne semblent pas avoir la capacité de reconnaître un message émotionnel par communication faciale ou verbale. En effet, après avoir étudié plusieurs recherches sur la capacité de différenciation des catégories d'émotions chez les nourrissons (Kahana-Kalman & Walker-Andrews, 2001; Soken & Pick, 1999; Haviland & Lelwicka, 1987; Caron, Caron & Meyers, 1985) comparant la réponse émotionnelle de l'enfant face à une expression parentale, Widen et Russell (2008) rapportent que les seuls résultats probants démontrent que les bébés de moins de 10 mois détectent (ce qui n'est pas discriminer et encore moins reconnaître) les 'traits faciaux ou les agencements de traits' associés à des expressions faciales

émotionnelles, que leurs expressions concordantes sont des réponses élicitées par l'expression parentale, et qu'il y a certainement une part d'imitation dans ces réactions. Ils doutent fort qu'avant cet âge les nourrissons reconnaissent les catégories d'émotions, mais plutôt que ce sont les expressions émotionnelles des adultes qui influencent leurs réactions et comportements. Les expressions verbales captent l'attention de ces bébés, alors que des stimuli verbaux, du toucher, et visuels, altèrent et régulent leurs états affectifs. Cependant, les bébés démontrent rapidement une capacité perceptuelle de détection et de discrimination entre les valences affectives (si l'émotion est positive ou négative) : « Mais ni les perceptions ni les réponses émotionnelles des nourrissons ne requièrent une compréhension du sens de la communication exprimée. Nous questionnons à savoir si avant autour de 10 mois d'âge les nourrissons peuvent reconnaître un message émotionnel transmis par une communication faciale ou vocale » (Widen & Russell, 2008, p. 351, notre traduction). Un des concepts importants pour le transfert des connaissances du parent vers l'enfant par la communication est le développement de l'attention conjointe. Vers l'âge de 6 mois les nourrissons commencent à alterner leur regard entre un objet et leur parent. Mais ce n'est qu'autour de l'âge de 9 mois qu'ils commencent à utiliser des gestuelles pour attirer et joindre leur attention à celle du parent vers un objet ou une situation. Cette habileté se consolide vers l'âge de 13 mois, quand l'enfant utilise la communication nonverbale pour faire d'un objet le sujet d'une interaction. Vers 10-12 mois d'âge, les bébés peuvent utiliser l'expression parentale comme référence sociale (lors de situations inconnues, les bébés regardent leur parent et utilisent l'expression parentale comme information supplémentaire avant de prendre une décision sur l'action à entreprendre) pour

comprendre les situations ambigües et potentiellement dangereuses. Ils démontrent ainsi une certaine compréhension du message inhérent à l'expression émotionnelle faciale (Moses, Baldwin, Rosicky, and Tidball, 2001), bien que ce soit probablement une compréhension de la valence (la valeur positive ou négative) de l'expression qui leur sert à choisir de s'approcher ou à s'éloigner de la situation ambiguë (Widen & Russell, 2008). Ce ne serait pas encore nécessairement une discrimination claire des catégories des émotions qui serait démontrée par de tels comportements. Autour de 1 an, les bébés commencent à parler et leurs parents rapportent qu'ils n'utilisent qu'un seul mot émotionnel avant l'âge de 2 ans : 'bon' (Ridgeway, Waters, & Kuczaj, 1985). Après 2 ans, l'âge où commence la petite enfance, ils commencent à utiliser les mots 'content', 'triste', fâché', et 'peur' (Ridgeway et al., 1985) et ainsi démontrent une compréhension de l'information contenue dans une émotion. Appuyés par les recherches de Watson sur la détection de la contingence chez les nourrissons (1972, 1979, 1985, 1994), Gergely et Watson (1996) proposent un modèle développemental de la différentiation des émotions émergeant vers l'âge de 5 mois (et potentiellement actif tout au long de la vie), période du développement où les bébés préfèrent les contingences imparfaites entre eux et un objet, de nature semblable aux interactions avec un parent 'assez bon'. La « Théorie du biofeedback social et du miroir affectif parental », élaborée par Gergely et Watson (1996), et poussée plus loin par Fonagy et al., (2002), décrit ces comportements dyadiques innés où l'expression d'une émotion chez l'enfant provoque chez le parent un comportement de reflet facial de l'expression de l'enfant appelée le « miroir affectif parental ». Ce sont ces comportements parentaux qui sont utilisés par le détecteur de contingence de l'enfant pour sensibiliser l'enfant aux

sensations internes associées à une émotion et pour discriminer entre les catégories d'émotions en les représentant. Peu d'études se penchent sur l'importance de l'expérience viscérale comme premier contenu représentationnel d'une émotion. Ce modèle a retenu l'attention de l'auteure par sa centralisation sur la sensation viscérale émergeant de l'expérience d'une émotion et par le fait que la sensibilisation à ces sensations émotionnelles permette une autodétection du soi ancré dans le corps et son expérience endogène. Cependant, la « Théorie du biofeedback social et du miroir affectif parental » s'assoit aussi, pour expliquer la représentation des émotions, sur un processus représentationnel utilisant l'internalisation de l'image du visage parental pendant les interactions de biofeedback social comme contenu représentationnel d'une émotion. Le modèle faisant référence à deux contenus différents comme base essentielle de la représentation d'une émotion et expliquant la représentation des émotions à la fois par un processus d'appropriation d'expériences internes et par un autre processus d'appropriation d'information venant de l'extérieur du corps semblait contradictoire et embrouillé. C'était la première raison justifiant de réviser le modèle dans le but de le rendre plus parcimonieux. La seconde étant de rendre le modèle applicable à la thérapie des adultes. En effet, selon Fonagy et al. (2002), le miroir parental se doit d'être 'marqué' (markedness), sinon il sera 'manqué'. Un miroir serait marqué par le caractère 'exagéré' de l'expression faciale et de la prosodie de la voix, qui rendrait ainsi l'expression parentale proéminente et plus facile à saisir pour le détecteur de contingence de l'enfant comme étant une communication dont il est le récipient. C'est l'élément tenu responsable du découplage de l'expression parentale du parent lors de comportements de miroir face aux expressions d'émotion de leur enfant

(Gergely, Koos, & Watson, 2002). La voix et l'exagération vocale, signalant à l'enfant que l'expression du parent (le miroir parental) ne représente pas l'expérience interne du parent, protègerait l'enfant d'un problème d'attribution (the attribution problem) en cas de miroir d'une émotion négative comme la colère par exemple. En effet, un miroir parental de la colère du bébé montrerait l'image d'un parent fâché, ce qui serait déstabilisant pour un enfant ayant déjà appris que la colère va souvent de pair avec la violence (ce qui pourrait lui faire peur), ce qu'on appelle le contenu dispositionnel de la colère ou les comportements associés avec l'expérience d'une émotion particulière (dispositional content). Cependant, cette logique de la théorie requiert que le nourrisson ait déjà appris à différencier et catégoriser les émotions avant même de rencontrer les interactions de biofeedback social pour faire une inférence sur les dangers d'un parent en colère, ce qui justifie de revoir la logique interne du modèle puisque ce sont les processus de biofeedback social qui sont censés apprendre à l'enfant à discriminer entre les catégories d'émotions. Si un miroir parental contingent génère des représentations des différentes émotions au travers de la sensibilisation à des configurations particulières de somatosensations associées à l'expérience d'une émotion, il semble peu probable que l'absence d'internalisation d'une image faciale et vocale, exagérée ou non, porte l'enfant à confondre son état interne avec celui de son parent. Par ailleurs, le miroir parental manqué, lui, fait référence à un miroir parental où l'exagération faciale ou vocale est absente, selon la trajectoire d'internalisation proposée par Fonagy et al. (2002). Le miroir peut également être manqué si il n'est pas contingent à l'expérience émotionnelle de l'enfant, et plus particulièrement aux changements dans son expression, selon la trajectoire de sensibilisation expliquée par le

principe de biofeedback social de la théorie. Si le miroir parental est réussi, l'enfant deviendra sensibilisé à ses expériences émotionnelles internes. On parle ici d'une sensibilité physiopsychologique tournée vers l'intérieur du corps, très différente du concept de sensibilité parentale à l'enfant. En effet, bien qu'une sensibilité parentale aux expériences émotionnelles de l'enfant soit aussi très importante dans l'exercice d'un miroir parental contingent à ces expériences, ces deux sortes de sensibilités sont à distinguer. L'une est intrapsychique, alors que l'autre est relationnelle. La sensibilité parentale dans les échanges de biofeedback requière de l'empathie envers l'expérience interne de l'enfant. L'empathie, cette capacité à ressentir l'émotion de l'autre pour la partager, est nécessaire puisque lors de processus de biofeedback social, l'émotion ressentie par l'enfant doit être partagée par le parent pour être retournée (feedback) sous forme d'expression faciale (facial mirroring) au détecteur de contingence de l'enfant qui l'utilisera pour sensibiliser les somatosensations liées à l'expérience d'une émotion. L'empathie est considérée comme étant une qualité thérapeutique essentielle à la plupart des théories du changement, qu'elle soit relationnelle, interpersonnelle, intersubjective, relation d'objet, ou autre. L'expérience d'une émotion chez l'enfant accompagnée par son expression faciale peut être partagée empathiquement par le parent, ce qui fait surgir chez ce dernier une expression faciale de miroir. Ce miroir change en tandem avec l'expression de l'enfant transformée par les actions de son détecteur de contingence. C'est ainsi que l'empathie parentale renvoie à l'enfant son état interne pour détection, sensibilisation, et représentation dans une boucle de biofeedback social (BFS). Cette théorie du développement de la symbolisation chez les enfants est utilisée en thérapie chez les adultes pour les aider à symboliser leurs émotions (Bateman & Fonagy, 2004;

Bateman & Fonagy, 2003). La voix de bébé (motherese), le ton plus aigu et chantant qu'on utilise avec des bébés, parfois aussi entre amoureux, ou avec des animaux de compagnie, devient dans la thérapie avec les adultes la voix marquée et calme du thérapeute (therapese) (Fonagy, 2010), une proposition plutôt incompatible avec la pratique clinique chez les adultes, d'où la seconde motivation de révision du modèle. Cette thèse va explorer et modifier le modèle de Gergely et Watson, afin de résoudre les problèmes de logique interne du modèle, pour le rendre plus parcimonieux et pour étendre son applicabilité à la psychothérapie, notamment celle des adultes. Le chapitre deux de cette thèse, présenté sous forme d'article, a donc comme objectif de faire la révision du modèle de Fonagy et al. (2002) et de Gergely et Watson (1996) et plus précisément l'hypothèse de l'expression « marquée » (markedness). Cet article est intitulé « Sensitization to emotions and representation formation through social biofeedback: Is markedness of the parental mirror a necessary mechanism? ». Cette étude montrera comment le modèle, sans l'hypothèse du miroir marqué, promeut quand même l'acquisition de la capacité à devenir sensible aux somatosensations des émotions et à les représenter implicitement et symboliquement. Le chapitre trois de cette thèse, également présenté sous forme d'article, est intitulé « Sensitization to emotions and representation formation in adult psychotherapy: A clinical illustration of the revised social biofeedback model » et portera sur l'illustration clinique du modèle révisé et de ses principes à l'aide d'une vignette clinique analysée selon la perspective du Boston Change Process Study Group (BCPSG), utilisée pour contraster les processus du biofeedback social. Il est important de préciser que la vignette n'est pas disponible en version vidéo et constitue donc un matériel de seconde main.

Chapitre 2 - Sensitization to emotions and representation formation through social biofeedback: Is markedness of the parental mirror a necessary mechanism?

Short Title: Sensitization to emotions and representation formation

Sensitization to emotions and representation formation through social biofeedback: Is markedness of the parental mirror a necessary mechanism?

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Abstract

This study reviews Gergely & Watson's social biofeedback theory of parental affect-mirroring (1996), furthered by Fonagy, Gergely, Jurist and Target (2002), especially the 'markedness' hypothesis. These authors hypothesize that a salient facial expression and the singsong prosody of markedness called 'motherese' are necessary for successful emotion sensitization and symbolization. The revision investigates whether this is accomplished through 'internalization' mechanisms requiring markedness of the mirroring, or solely through social biofeedback processes. The article argues that the infant contingency-detection mechanism (similarly to that of adult biofeedback training) mediates the functions of sensitization, representation, and symbolization of emotions through its processes of covariance-invariance detection, maximization, and contingent control of the parental mirroring, whether the mirroring is marked or not. The review argues that a caregiver producing a covariant-invariant mirroring can help bring the infant's emotional somatosensations to consciousness along with its implicit dispositional content without using motherese. It considers the clinical implications of the new model and speculates about parental difficulties centered on sharing troubling emotions. Finally, it discusses how the model may be a mediating mechanism in the change process in the therapy of adults through the promotion of sensitive emotions, their awareness and symbolization.

Keywords: emotion, sensitization, symbolization, social biofeedback mirroring, somatosensation, markedness.

Sensitization to emotions and representation formation through social biofeedback: Is markedness of the parental mirror a necessary mechanism?

Introduction

It is now widely recognized that a healthy psyche is the product of a complex developmental process (DeOliveira, Neufeld Bailey, Moran & Pederson, 2004; Lachman, 2001; Stern & BCPSG, 2006). The optimal end product of this development is a person with the capacity to act on the perceived world: an agentic self (Fonagy, Gergely & Target, 2007; Fonagy, Gergely, Jurist & Target, 2002), which rests on: 1- the regulation and appropriation of emotions as signals to a self that guides experience and action (Gergely & Watson, 1996); 2- the formation of symbolic representations of emotions that permit the dealing of affective life as a series of symbolic subjective events enabling communications to the self and with others (Fonagy et al., 2007; Fonagy, Target, Gergely, Allen & Bateman, 2003; Fonagy, 2003; Fonagy et al., 2002, Gergely and Watson, 1996). Adult psychopathology is often considered to be the result of a derailed development of the capacity to form representations to think with (Fonagy et al., 2003; Fonagy et al., 2002). In such a developmental perspective, change in the psychological treatment of adults requires the repair of dyadic regulative processes damaged in infancy (Fonagy et al., 2002). Fonagy's developmental model of representation formation, based on Gergely and Watson's social biofeedback theory of parental affect-mirroring (1996), aptly conceptualizes the acquisition of symbolization and agency and can serve as a guide for the understanding of how it is achieved by adults in psychotherapy.

Even if adults are not infants, the acquisition of the symbolic capacity to deal with emotions in children and its repair in the psychotherapy of adults should involve similar intersubjective processes: “In fact, emotional mirroring can be identified as a potentially central mechanism of therapeutic change in child psychotherapy, and it has been demonstrated to characterize face-to-face patient-therapist interactions in adult psychotherapy as well” (Krause, 1997, in Fonagy et al., 2002, p. 199). According to Fonagy and his colleagues, the marked mirroring of an infant’s affective state by her caregiver (e.g. giving salience to the parental mirroring of the infant’s emotion through the use of ‘motherese’, sometimes called in the vernacular ‘baby talk’, as well as through visual emphasis of the mirroring) is a *necessary* interactive phenomenon allowing an emotion to be raised to consciousness and become symbolically represented (DeOliveira et al., 2004; Fonagy et al., 2003). Markedness should then be operative in the therapy of adults. Fonagy et al., (2002) advanced that “the formal features of the psychoanalytic setting as well as the rules of conduct specified in the analytic contract can be interpreted as establishing salient features of markedness that clearly distinguish the use of language in the analytic discourse from its everyday use in communicative exchanges” (p. 314). More recently, Fonagy (2010) has designated by ‘therapese’ the markedness that would be produced vocally by a therapist calmly mirroring her borderline patient’s highly aroused inner state. However, there is doubt that this ‘patient talk’ should be the obligatory road to the symbolization of emotions in adult psychotherapy, as is stated by the affect-mirroring model. In fact, a closer look at the social biofeedback theory of parental affect-mirroring allows for a

reconsideration of the importance of the markedness hypothesis even in infant development.

What follows is a re-examination of Fonagy's developmental model of symbolization and agency, with an emphasis on the markedness hypothesis. First, we will examine how the model fosters representation building, and the mechanisms necessary for social biofeedback processes to be successful. Then, we will review the reasons why markedness of the parental mirror is believed to be essential to their model of representation formation. After, we will question certain premises requiring markedness for successful representation formation and offer an alternative hypothesis leading to successful social biofeedback processes even if the parental mirroring is unmarked. Finally, we will briefly sketch the potential for adult therapy that social biofeedback could offer when unconstrained by the markedness hypothesis.

Symbolization of Emotions

The Attribution Problem

Infants require help from caregivers to learn about the world around and the world inside them. Gergely and Watson (1996) have expounded a most exciting theory of dyadic interaction in their seminal paper called the "*Social Biofeedback Theory of Parental Affect-Mirroring*", which has been furthered by Fonagy et al., (2002) and Csibra and Gergely (2006). It is hypothesized that infants learn about their inner states, especially their emotions, through an interactive dyadic process. In this process, the parent acts as a biofeedback entity to help the infant become sensitive to the finer manifestations of an

emotion, bring the experience to consciousness, and appropriate it in the form of representations of the emotion. The infant uses the information arising from the parental behaviors mirroring her inner state to progress along the developmental path to inner sensitivity and emotional consciousness. But this progression can be hindered. The authors are concerned about a potential danger imbedded in the social biofeedback exchange associated with the parental mirroring of negative emotions. It constitutes 'the attribution problem' and they posit the problem thus:

> One of the most intriguing and apparently paradoxical aspects of parental affect-mirroring during state-regulative interaction is the fact that when the baby is in a negative state, the parent presents a reflection of a *negative* emotion display while *successfully soothing the infant*. How does the baby interpret the negative affect-expression of the parent and how is it possible that the presentation of a negative emotion display is instrumental in modulating the infant emotion-state in a positive direction? (Gergely & Watson, 1996, p. 1196; emphasis added)

The consequences of facing a parent mirroring anger or sadness could be problematic for the child. If the infant misattributed a parental display mirroring her anger to the parent and mistook it for a real parental emotion, the infant could predict that the parent might behave angrily and so become further distressed by the sight of an angry parent. This danger of misattribution for the infant is summarized by the question: “How does a baby know that this expression refers to his/her *own* state and not to that of the parent?” (Fonagy et al. 2002, p. 175). Gergely, Watson, Fonagy, and their colleagues’ answer to the attribution

problem is that the parent's affect-mirroring is characterized by a 'specific perceptual feature' called 'markedness'.

Markedness

They proposed that by marking their affective displays, sensitive caregivers help their infant differentiate as-if (or pretend) emotion communications from realistic ones by producing a vocally exaggerated version of their realistic emotion expression which has been described previously as 'child directed speech' or motherese (Fonagy et al., 2002; Ferguson, 1964; Snow, 1972; Fernald, 1991, 1992, in Gergely & Watson, 1996). It has been suggested that the sing-song voice or 'baby talk' used by parents purposes to direct the baby's attention towards the communication of emotions and intentions, and towards the behaviors used in their modulation (Fernald, 1991, 1992; Fonagy et al,. 2002; Fonagy et al., 2007; Stern, Spieker, Barnett, & Mackain, 1983, in Gergely & Watson, 1994). Fonagy et al. (2002) further suggest that "apart from exaggerating the intonational vocal pattern of their affect-expressive displays, caretakers will also exaggerate the visual facial features of the emotion display as well." (p. 178). The exaggerated character of the vocal and facial expression of the parental mirroring is the element responsible for the decoupling of the parental expression from the parent (Gergely, Watson, & Koos, 2002). The baby differentiates a mirroring display from a real parental emotion by these exaggerations.

The angry or sad infant doesn't get further distressed when facing her caregiver's marked affect-mirroring of a negative emotion because the first function of markedness signals the *nonconsequentiality* of the parental mirroring, in reference to the suspension of

negative behavioral consequences for the infant when faced with the display of negative emotions by the mirroring caregiver (Fonagy et al., 2002). This signal of 'nonconsequentiality' is required since attributing an emotion to someone would automatically include the consequences of experiencing the given emotion for the parent, or of witnessing the parental emotion for the infant, such as actions and attitudes that are likely to accompany the emotional experience: "the dispositional information that emotions express specify that under certain circumstances a person, who is in the given dispositional emotion-state, is likely to behave in certain ways rather than others" (Fonagy et al., 2002, p. 152). In the case of anger, for example, representations of its dispositional content might help *predict* that a person is more likely to be aggressive towards others or its environment, and therefore should be avoided. An infant's facial expression, when experiencing anger, would be mirrored by an angry looking caregiver. Markedness of the vocalization and facial expression produced during the mirroring would signal to the infant, for example, that even if Daddy looks angry right now, he is 'pretending' and therefore will not scold her, preventing the generation of fear in the infant. Markedness tells the infant that she can 'suspend' her prediction of her caregiver's behaviors associated with the given emotion being mirrored; it signals the 'nonconsequentiality' of the mirrored emotion.

But even if the mirrored emotion is positive, and therefore safe for the infant in terms of consequentiality, the infant still has to know that the mirrored emotion doesn't 'belong' to the parent in order to use the mirroring for representation formation. The baby knows that the caregiver's 'marked' mirroring behavior doesn't reflect his internal

emotion-state because of the second function of markedness, which signals *non-ownership* of the mirroring by the parent, and will provoke in the infant what the authors call 'referential decoupling'. When producing a 'marked' mirroring, the caregiver is signaling that he does not experience the emotion he displays. They hypothesize that the markedness of the parental mirroring display will *inhibit the attribution of the perceived emotion to the parent* in reference to the "fact that in the interpretation of the marked affect-display the referential connection between the emotion expression and the corresponding dispositional state of the agent producing the display will be *suspended*: the perceived emotion display will be 'decoupled' from its referent" (Fonagy et al., 2002, p. 178). Lack of markedness, a too realistic looking parental affect-mirroring, would automatically impede decoupling: the infant would receive the mirroring as a true parental emotion; the caregiver would remain the 'owner' of the emotion displayed and would preclude the infant's ability to use the mirroring as a stand in for an inner event. Decoupling of the connection between the parental inner state and the mirroring will allow for the 'anchoring' of the mirroring in the infant, to be used in representation formation of her own emotional experience (Fonagy et al., 2002). Decoupling by markedness would thus be *necessary* for the symbolization of affective experiences (Fonagy et al., 2002; Fonagy et al., 2007; Gergely & Watson, 1996).

While the parental display might be decoupled from the parent due to the markedness of the parental mirroring, it still needs to be interpreted by the infant as referring to *'someone's* emotion'. Gergely and Watson, along with Fonagy et al., suggest

that this process, which they call *referential anchoring,* is determined by the high degree of contingent relation between the parental mirroring and the infant's emotional expression:

> The infant's contingency-detection system will register the temporal contingency and cross-modal similarity of pattern between the parent's expression and his own on-going affective behavior. The perception of this contingent relation will provide the basis for the referential interpretation and grounding of the decoupled emotion display. As a result, the infant will *referentially anchor* the marked mirroring stimulus as expressing his *own* self-state". (Gergely & Watson, 1996, p. 1199)

With this appropriation of the parental affect-mirroring as pertaining to her own experience, the infant could use it to form representations that can be used for self-regulation, in the view of Fonagy et al., (2002):

> By setting up parent's "marked" emotion reflective displays that are contingent with the infant's emotion-expressive behaviors, the baby establishes secondary representations that become associated with his primary, non-conscious, procedural affect states. These secondary representational structures will provide the cognitive means for accessing and attributing emotion states to the self that will form the basis for the infant's emerging ability to control as well as to reason about his dispositional emotion states. (Fonagy et al., 2002, p. 201)

Caregivers showing markedness difficulties or failures of mirroring would impede their infant's emotional development (Fonagy et al., 2002, 2003).

Pathological consequences. Fonagy and his colleagues hypothesize that 'unmarked' parental affect-mirroring may have pathological consequences. Parents producing a realistic mirroring of their infant's negative emotion would escalate, rather than contain, the infant's negative state (Fonagy et al., 2002; Gergely & Watson, 1996). A realistic mirroring of *any* infant emotion would automatically see it "be attributed to the parent as his or her real emotion, and it will not become anchored to the infant either. Consequently, the secondary representation of the baby's primary emotion-state will not be established, leading to a corresponding deficiency in self-perception and self-control of affects" (Fonagy et al., 2003, p. 435). Failure to anchor the mirroring as pertaining to its inner experience will perturb the infant's emotional development: "If the caregiver mirrors the baby's emotions inaccurately or neglects to perform this function at all, the baby's feelings will be unlabeled, confusing, and experienced as unsymbolized and therefore hard to regulate" (Fonagy et al., 2003, p. 426). They believe that "mothers who are unable to contain and become overwhelmed by their infant's negative affect-expression can be expected to show this structural pattern of mirroring" (Fonagy et al., 2002, p. 193). In their view, insecurely ambivalent/preoccupied and/or borderline parents are likely candidates for the exhibition of unmarked affective responses of this kind (Bateman & Fonagy, 2003; Bateman & Fonagy, 2004; Fonagy et al., 2003). DeOliveira, Neufeld Bailey, Moran & Pederson (2004) have constructed a framework for understanding the development of infant psychopathology, more precisely the development of disorganized attachment, on two theories of emotional socialization, one of which is the social biofeedback theory of

parental affect mirroring. They suggest that an emotion-based mechanism gone awry might foster dysfunctional emotional processes giving rise to pathological attachment. One of their hypotheses for this dysfunction would be that "the fundamental attachment of meaning to signals of affects" would be compromised by maternal difficulties with their reflexive capabilities when faced with a negative emotional expression by the infant, as a consequence of their own traumatic experiences in infancy (p. 442).

In this perspective, the ability of caregivers to mark their mirroring would impact the development of the representational capacities of their infants. If markedness of the parental mirroring of an infant emotion is necessary for representation building, it logically implies, within the social biofeedback model, the existence of an infant detection mechanism geared towards markedness signals. Social biofeedback is built upon an infant detection mechanism, albeit not one that detects markedness signals, but rather one of "Contingency detection as the mechanism underlying biofeedback training and parental affect-mirroring" which mediates the sensitization to the emotion (Gergely & Watson 1996, p. 1192). The infant's detector finds the contingency between changes in caregiver mirroring expressions and changes in infant inner emotional cues; the detection of the relation between contingent changes occurring between the two. Because social biofeedback processes are seemingly accomplished without the recourse to any other kind of detection, it raises questions about the mechanisms that would have to be part of these processes to detect the aural and visual markedness signals. The doubts raised by such reasoning warrants the revision of the model in order to answer the questions raised by the

markedness hypothesis in order to find out whether the functions ascribed to the markedness signals might be performed by other mechanisms, whether caregiver or infant mechanisms embedded in processes rooted in contingency detection, since it is at the core of the social biofeedback model of emotion sensitization and representation building (Fonagy et al., 2002; Gergely & Watson, 1996, 1999).

We now review the social biofeedback model, with a keen attention given to the workings of the infant's biofeedback mechanisms, in order to try and find out whether the attribution problem is real, or if it can be solved by other means than through markedness of the parental affect-mirroring. Before focusing on the minute workings of such a dyadic biofeedback mechanism as social biofeedback, it is important to illustrate how both parental and infant structures seem to be innately in place to foster such interactions.

Sharing Inner States

Ostensive Communication and the Pedagogical Stance

Since children have to develop an understanding of minds, it is hypothesized by Csibra and Gergely (2006) that pedagogy is a primary cognitive system that has evolved to promote the transmission of relevant information through special dyadic exchanges between knowledgeable adults and receptive infants (Fonagy et al., 2007). They believe that the ability to teach and to learn from teaching might be an even earlier adaptation than either language or the ability to attribute mental states (Gergely & Csibra, 2006). They call this the 'theory of human pedagogy', and explain that there are two types of pedagogical communicative cues for which infants demonstrate specific receptivity. The first type deals

with cues of 'referential knowledge manifestation', which include early social communicative phenomena such as early turn taking, joint attention, 'proto-declarative' pointing, social referencing and imitative learning. These are pedagogical communications that aim to facilitate efficient transfer of knowledge about the world. The second type includes cues of 'ostensive communication' that "are assumed to trigger a specific receptive attentional and interpretative attitude, the 'pedagogical stance, in the infant" (Fonagy et al., 2007, p. 308), and the aim of which is *the intersubjective 'sharing' of internal psychological states*. Ostensive cues identify a potential teacher for the infant and help with the establishment of eye-contact, to be reinforced by other ostensive cues such as 'knowingly' raising the eyebrows, a momentarily widening or shrinking of the eyes, tilting of the parent's head toward the infant, as well as turn taking, and contingent reactivity (specific immediate action following an infant's reaction) (Gergely & Csibra, 2005). These cues tell the infant that her parent has a) the desire to communicate information to her, b) that this communicative intention function as an 'addressing cues' indicating that the recipient of the parental communication is her (Gergely & Csibra, 2006 ; Csibra & Gergely, 2006), and c) that this communication contains new and pertinent knowledge about the referent, who should be identified with the help of the parental expression of 'referential orientation signals' such as *eye-gazing direction*, *eye-gazing movement*, or by *finger-pointing* (Gergely, 2007). According to Fonagy et al., (2007): "These are often accompanied by calling the infant by name using the salient and specific type of 'marked' speech intonation pattern of 'motherese'" (p. 308). They assume that:

> ostensive cues constrain and direct infants' interpretation of adults, object-directed actions (such as their object-referential emotion expressions, verbal labeling, demonstrations of the functional properties of objects) as conveying to them new and relevant knowledge about the referent that they need to extract and bind to its representation as its essential property. (p. 308)

Fonagy and his collaborators argue that it is due to the interaction between ostensive cues and the 'pedagogical stance' of infants that parents naturally, and mostly unconsciously, accomplish different behavioral tasks that promote representation formation such as affect-mirroring. They hypothesize that: "the psychological mechanism involved in affect-mirroring is the same process as that demonstrated in biofeedback procedures" (Fonagy et al., 2002, p. 162). Biofeedback procedures are used by subjects who want to become *sensitive* to difficult-to-apprehend bodily sensations in an attempt to influence, or even control, a nonconscious autonomic process by raising it to consciousness.

Sensitizing

For Fonagy and colleagues, as well as other researchers, Gergely and Watson's social biofeedback theory of parental affect-mirroring is a model of the symbolization of emotions (Csibra & Gergely, 2006; DeOliveira et al., 2004; Fonagy et al., 2003). Yet, the model is foremost one of the *sensitization of emotions*, becoming sensitive to the grouping of somatosensations arising out of the experiencing of an emotion, and proposes "that infants first become sensitised to their categorical emotional-states through a natural social biofeedback process", and they argue that "this sensitisation process is mediated (similarly

to that of adult biofeedback training) by the mechanism of contingency detection and maximising" (Gergely &Watson, 1996, p. 1181). Becoming sensitive to mostly non-conscious sensations brought about by the emotion being experienced and expressed is what Gergely and Watson (1996) state is the premier goal of the model. The review of these procedures and their implications for the development of symbolization must start with an understanding of the principles of biofeedback training and the sensations it brings to consciousness.

Somatosensory sensations, homeostasis and emotions. The interior world of the body, its processes and changes, are mostly automatic and unknown to the individual. Great efficiency ensues: having to think of and remember to maintain blood pressure within healthy ranges, for example, would put considerable strain on a person's attention and executive capacities. According to Damasio (1999), homeostasis and emotions are essential to the survival of the individual. The former as "the regulation of the state of the internal milieu and the viscera" (p. 246) and the latter since "emotions are part and parcel of the regulation we call homeostasis" (p. 40). In the outside world resides both the means of sustenance and disruption for the organism. Imbalance in homeostatic parameters generates emotions that will motivate the individual to take the actions needed to reestablish balance (Solms & Turnbull, 2002; Damasio, 1999). These homeostatic parameters are measured by sensory receptors of the general somatosensory system. This sensory system (sometimes called *body sensitivity system*) is different from the visual, aural, taste, and olfactory sensory systems, called the specialized sensory systems. The somatic system of touch does

not have a specialized organ of perception. General somatosensations come from the entire body, most noticeably the skin, but also the internal organs (viscera), and the blood vessels (Campbell & Reece, 2005).

Biofeedback training and the development of a sensor-beamer. Biofeedback training procedures use an external sensor-beamer to develop an inner one. By using a machine able to measure and convey (sensing and beaming) inner changes resulting from variations in blood pressure, for example, a person can learn to sense and self-convey the formerly non-conscious information in order to regulate it (Miller, 1978). Biofeedback training is essentially "an acquisition technique of self regulation ability of an autonomic function, of which we are normally unaware, through a series of training aided by an additional outer feedback pathway" (Nishimura et al., 2007). Social biofeedback processes work similarly: the caregiver, "who can read and interpret" by sharing in their infant's emotional inner state (Gergely & Watson, 1999, p. 115) and beam back information to the infant by mirroring her emotional experience, is the sensor-beamer, or external feedback pathway. By recognizing and mirroring the infant's inner state in covariance with its changes, the caregiver presents information that can be detected by infant mechanisms to help her become sensitized to her implicit emotional inner states so she can sense them, categorize them, bring them to consciousness, represent them, regulate them, and be informed by her inner world:

> early affect-regulative mirroring interaction with the caregiver provides an environment in which, through the process of contingency detection and social

> biofeedback, sensitization to internal states and secondary representation-building can take place, leading to the establishment of cognitively accessible representations of the subjective mental state of the self. (Fonagy et al., 2002, p. 222)

This is possible because of a tripartite correspondence between the inner cues accompanying an infant's emotional experience, and the outer cues simultaneously arising (physical and behavioral cues such as the facial display of the emotion), and the parent's facial and vocal reflection of the infant's emotional experience. This tripartite correspondence is similar to the one used in biofeedback training procedures where two conscious variables are used to raise an unconscious third to consciousness through a triangulation process.

The tripartite correspondence. An infant's experience of an emotion comprises a distinctive pattern of internal cues, accompanying a distinctive emotional expression: "When we are in the grip of an emotion, a cascade of changes occurs in split seconds, without our choice or immediate awareness, in the emotional signals in the face and voice; preset actions; learned actions; the autonomic nervous system activity that regulates our body" (Ekman, 2003, p. 65). This has made researchers Meltzoff and Gopnik (1993) suggest that "there are pre-wired bi-directional connections between facial emotion expression and corresponding differential physiological emotion-states, which are active from birth" (in Gergely & Watson, 1996, p. 1183). Since an infant's facial display changes in tandem with changes in her internal emotion cues, and the parental mirror varies in accordance with changes in the infant's facial display, it can be said that all three covary, or

correspond. Similarly to biofeedback procedures, amplifications or reductions in the infant's experience of an emotion would result in consequent changes in the parental mirroring.

In biofeedback training, an unconscious inner state (such as blood pressure for example) covaries with other cues that accompany the experience, such as chest pain and shortness of breath for example, as well as with the measurements beamed by the machine's monitor in the shape of a graph (Miller, 1978). Thus, consciously perceivable measurements of the variations in an unconscious process such as blood pressure (conveyed and visible as changes in a graph displayed on a monitor), along with the consciously perceivable inner and physical changes corresponding to these blood pressure variations (such as facial skin temperature, chest constriction, and changes in breathing patterns, for example) will sensitize the person to the inner sensations accompanying blood pressure, thus bringing them to consciousness. In social biofeedback, the inner sensations accompanying the experience of anger, for example, will covary with the infant's facial expression of said emotion (such as breath constriction and bulging eyeballs, for example) and with the parental mirroring (visible to the infant as the changes in the parental mirror reflects her own varying emotional expression). This tripartite correspondence will be instrumental in sensitizing the infant to the inner and outer sensations accompanying the experience of anger, linking them together, and thus bringing the entire experience to consciousness. For example, let's say the infant is angry over having the nipple taken away. The caregiver will make a face mirroring the infant's facial expression while saying what is

happening to the child like: ‘Henry is angry! Henry wants the nipple back’. The infant’s detection mechanisms will monitor the infant’s inner cues that change in tandem with the parental mirror to circumscribe only those covarying with the mirroring, and by association, with the emotion. The infant becomes sensitive to, and eventually gathers together, the distinctive categorical pattern of emotion-specific internal cues and external cues whose combined presence is indicative of her internal state, and so becomes able to detect and attribute the presence of the emotion to herself (Fonagy et al., 2002; Gergely & Watson, 1996). The sensitizing process forms a sensation-representation of the emotion with which she can identify her emotional experience, and be informed by it to regulate herself:

> there is evidence (Ekman et al., 1983; Ekman, 1992; Izard & Malatesta, 1987) for a basic set of emotion-states that induce the activation of distinctive patterns of internal state cues as well as a distinctive configuration of expressive behavioral cues. Therefore, the predictive validity of these cues when combined as a group is highly indicative of the presence of the underlying emotion-state. (Gergely & Watson, 1996, p. 1193)

The verbal label accompanying the parental mirroring will be used to form a symbolic representation (Fonagy et al., 2002; Gergely & Watson, 1996). But before getting to the mechanisms of representation formation, the dyadic mechanisms of social biofeedback must be examined more fully.

The Social Biofeedback Theory of Parental Affect-Mirroring

The dyadic interaction at the heart of the social biofeedback theory of parental affect-mirroring is successful when the partners, like dancers, each execute their own part of the dance in tandem with the other. The infant experiences an emotion and displays it, and the parent mirrors the infant's behavior. The infant responds to the parental mirroring and influences it, before being influenced by the mirroring again in a loop of biofeedback interaction. Therefore, we will first examine the infant's half of the pas-de-deux, and more precisely the infant's contingency detection.

The Infant's Contingency Detection Module

When the infant experiences an emotion, the parent reacts with a mirroring display (parental affect mirroring: PAM). The infant faced with a PAM, just like a subject face-to-face with the biofeedback machine measuring a nonconscious autonomic process, must use it to achieve the capacity to detect and attribute her internal emotional sensations to herself through mechanisms of contingency detection: "we hypothesize that the developmental process leading to sensitisation to and categorisation of emotion-state cues in the self as a function of parental affect-mirroring is also mediated by the contingency-detection mechanism" (Gergely & Watson, 1996, p. 1193). Contingency detection in biofeedback procedures occurs when, in the presence of the biofeedback monitor, the subject's **contingency detector** carries a **contingency analysis** *backwards in time* "scanning for internal and behavioral responses that were present before the onset of the 'teaching' stimulus" (p. 1193) (let's say breathing rates and muscle tension responses). The subject will be scanning for cues that were present before the onset of the changes observed on the

monitor. Gergely and Watson call this the *necessity index* (what is necessarily accompanying the unconscious process one wants to become conscious of). In the case of the dyadic example, the infant's contingency detector would 'look back' in time to find whether the inner and outer cues accompanying the emotional experience of anger tend to precede the parental mirror more than chance would allow, and therefore might have provoked its apparition. The biofeedback subject also carries an analysis *forward in time* testing to what degree changes in the subject's set of internal and external cues predict *changes in the graph presentation* on the monitor, the external biofeedback stimulus. They call this the *sufficiency index* (what behavior changes are sufficient to achieve variation of the monitor's graph). In the dyadic example, the infant's contingency detector would 'look forward' in time to find whether the parental mirror tends to follow and reflect certain changes in emotional expression in the infant more often than chance would allow: "This set of internal and external stimulus cues will exhibit contingent variation not only with the internal state target that is causing them, but also with the external feedback stimulus that covaries with the internal target state" (Gergely & Watson, 1996, p. 1193). This is the tripartite correspondence referred to earlier. The comparing of the two indexes by the contingency detector is called the '**contingency maximizing strategy**', which will circumscribes the full set of somatosensations found to be predictive of the infant's emotion forming a global sensation that can identify the presence of the emotion in the infant and that will serve for representation formation (Fonagy et al., 2002; Gergely & Watson, 1996, 1999). By amplifying or reducing each internal and behavioral cue that was present in the

infant at the appearance of the parental mirror, the contingency detector will alter the infant display in ways that will be mirrored by the parent only if those changes correspond to the emotion identified by the parent as being the infant's inner state:

> by gradually expanding or reducing the set of state cues considered to be associated with the target state as a function of the direction of inequality between the necessity versus the sufficiency indices of contingent control (contingency maximising), the subject will eventually identify the set of internal and external state cues that show the highest degree of *contingent variation* with the biofeedback cue and, by association, with the internal state as well. As a result, the subject will eventually become sensitive to and learn to group together those (internal and external) state cues whose combined presence is indicative of the change in the internal target state and so will become able to detect and attribute the presence of the internal state to himself/herself. (Fonagy et al., 2002, p. 169, emphasis added)

The contingency detector identifies which cue alteration is followed by changes in the parental mirror until it has found *the full set of apprehensible sensations associated with an emotion.* When the contingency detector can manipulate the parental display solely by making changes in the infant's circumscribed inner cues relevant to a given emotion-category, it is said to have achieved **contingent control** of the parental mirror. The global sensation thus circumscribed and sensitized to is used for representation formation.

To illustrate: 1- an infant experiences anger when the nipple is taken away from him. His somatosensations are undifferentiated and are accompanied by other inner cues

linked to the experiencing of anger, such as cues of proprioception, as well as outer physiological cues like a constricted chest, bulging eyes and facial heat due to high blood pressure, for example. 2- the caregiver, witnessing the child's angry facial and behavioral display, recognizes the expressed emotion (consciously or not) and produces a facial display that mirrors the changes occurring in the infant's facial display, co-varying with them (maybe even offering a verbal label 'Henry is angry!). 3- the infant's contingency detector looks backward in time, carrying out a contingency analysis that scans for the somatosensations that were present in the infant when the PAM first appeared (interoceptive cues stemming from the viscera and blood vessels, which are associated with the experiencing of anger, mixed with proprioceptive cues and behavioral emotional cues). These cues form the set of cues to be 'tested forward' to see if changing them (their intensity, shape, or contour) will bring a corresponding change in the parental mirroring of the infant's anger. 4- the contingency detector carries out a contingency analysis forward in time, scanning for the inner cues found to produce a corresponding variation in the parental mirror when altered. Changing an inner cue that transforms the infant's face in a way not related to the expression of anger (such as a momentary lift of the inner corner of the eyebrows, for example) is ignored by the parental mirror, since the parental facial display mirrors only the infant facial changes that are relevant to the identified emotion. 5- by gradually expanding or reducing the set of cues found 'to show the highest degree of contingent variation with the parental display', the contingency detector maximizes the detection, 'testing' to find the widest possible set of anger cues that can be mirrored by the

caregiver, while also reducing that set as much as possible to find only those cues that produce changes covarying with the parental mirror. 6- once it achieves contingent control of the parental mirror (altering the parental display solely through the manipulation of the infant's inner anger sensations), the circumscribed sensitized sensation of anger is used for representation formation and if a verbal label was offered during the interaction, it is used for symbolization formation as well.

This accomplishes the developmental 'sensitization function' that allows an infant to sense the inner cues indicative of an emotional experience and to group them in their respective categories (Fonagy et al., 2002). It must be accomplished by using an entity capable of 'measuring' the unconscious process: the caregiver. We now examine the parental part of the pas-de-deux: the parental affect-mirroring.

Categorization of Emotions Prior to Social Biofeedback Interactions

So far, the social biofeedback processes based on the contingency detector's mechanisms are shown to promote sensitization and representation formation through dyadic biofeedback, in a way similar to biofeedback training procedures, entirely without recourse to visual and aural markedness signals stemming from the caregiver, or a markedness signal detector in the infant. The contingency detection hypothesis seems sufficient to explain emotion sensitization and representation formation.

Yet, when considering the parental affect-mirroring (the sensor-beamer), the authors ask themselves the question 'How can an infant's anger be soothed by an angry-looking

caregiver?' and hypothesize that an infant faced with an unmarked parental mirroring would feel endangered by the negative behaviors that could potentially accompany the emotion:

> if the parent, in attempting to mirror the baby's affect display as authentically as he/she can, were to produce his/her normal, realistic expression of the corresponding emotion, the chances of misattribution would dramatically increase, as the infant would identify the parent's affect expression as a realistic emotion display and would attribute the corresponding dispositional emotion-state to the parent. (Fonagy et al., 2002, p. 177)

The caregiver must use markedness, the exaggerated facial display of the emotion and the vocal tone of motherese, to signal to the infant that the parental expression can be 'decoupled' from the parent.

The inclusion of markedness as a necessary mechanism for decoupling the parental emotional expression from the parent forces the elaboration of a precocious process of emotion recognition and categorization, achieved by the infant while observing the emotional expression of her caregiver, and to be represented through an internalization mechanism. In the social biofeedback theory of parental affect-mirroring, mostly through the markedness hypothesis presentation, Gergely & Watson (1996) and Fonagy et al. (2002) propose a second developmental line for the abilities to differentiate categorical emotion-states and to form emotion representations to be developed *before* encountering social biofeedback processes. The second half of the theory pivots on the argument that an

infant already knows which emotion category the parental mirroring belongs to when she encounters it in social biofeedback: "Clearly, the parent's affect-reflecting display expresses an emotion-state whose category is recognizable to the infant" (Fonagy et al., 2002, p. 175). This automatically implies that the infant must acquire the ability to **differentiate emotion categories** for the emotional expressions of others *prior to* her engaging in mirroring interactions. This non-biofeedback emotion-category formation hypothesis would precede and permit the second non-biofeedback representation formation of the dispositional content of emotions, through the internalizing of the observations of the dispositional content of her caregiver's emotional expression when he is experiencing the emotion personally, achieved outside of social biofeedback interactions:

> Previously, we have argued that the infant *first learns about the dispositional content of emotions expressive displays by observing the behavioural consequences of affect expressions in others*. Assuming that the infant has in this way *already come to represent the dispositional content of a given affect expression*, the presentation of a corresponding emotion-reflective display by the parent during affect-regulative interactions may pose a potential danger of misattribution. (p. 175, emphasis added)

First, the infant would have to represent for herself the different emotion-categories of the emotions expressed by her caregivers, but the authors do not explain how. Then she would represent the dispositional content of an emotion, the behaviors most likely to accompany the experience of an emotion, through the internalizing of the observation of the

dispositional content of those real parental emotion expressions, through internalization. After, during social biofeedback processes, the marked parental mirroring display would be recognized with the right dispositional content of an emotion because of its similarity to the previously internalized dispositional content of the observed real parental emotion expression: "The marked affect-display, nevertheless, remains sufficiently similar to the parent's normative emotion expression for the infant to recognise the dispositional content of the emotion" (Gergely & Watson, 1996, p. 1198). Attributing to the marked parental mirroring of the emotion the same dispositional contents witnessed in the real parental expression, the infant would form a representation for it: the marked mirroring eventually "will 'inherit' the dispositional information" associated with the parent's real emotion expression" (Gergely & Watson, 1996, p. 1202). Furthermore, since infants would internalize the dispositional content of real parental emotions before they would encounter a parental mirroring during social biofeedback processes, the authors hypothesize: "that the infant will construct a separate representation for it" (for the 'marked' mirroring) and will come to build *two* separate representations for each emotion (Gergely & Watson, 1996, p. 1200). One from the dispositional content observed from the real parental emotion expression and one from the marked mirroring display of the infant's own expression:

> Therefore, the separately represented marked emotion display will come to function as a *secondary representational structure* that will become activated through associative routes whenever the set of internal state cues corresponding to the given dispositional emotion-state is activated in the infant. (p. 1200)

The dispositional content of a parental emotion would be joined to the representation of the marked mirroring, allowing the infant to attribute the dispositional emotion state to herself (Fonagy et al., 2002; Gergely & Watson, 1996). In this manner, two separate representations would be built from internalization processes before joining to form a symbolic structure. This would bring Fonagy et al. (2002) and Gergely and Watson (1996, 1999) to argue that representation building is accomplished through: (1) the internalization of the consequences, or dispositional content, of parental emotions built by the infant when witnessing a caregiver experiencing an emotion, and (2) the internalization of the parental mirroring: "the ensuing establishment of the secondary representations of the infant's primary emotion-states through the ***introjection*** *of the marked and decoupled affect-reflective maternal expressions*" (our emphasis, p. 1201).

Fonagy et al. (2002) seem to assume that the earlier representation formation process of internalization has primacy over the Contingency Detection processes. They seem to contend that the emotion representation built from sensitization requires the representation built by the internalization of the marked mirroring for the infant to differentiate and become aware of her internal affective states:

> through processes of social biofeedback, the infant-attuned affect-mirroring environment may play an important role in establishing *differentiated emotion representations through sensitization to* <u>*emotion-specific patterns of internal-state cues.*</u> Furthermore, already during the pre-verbal stage *adaptive affect-mirroring* may provide an early opportunity for establishing second-order representations of

> primary affect states *in the form of internalized representations of the marked mirroring displays* that the infant comes to associate with the contingent internal affect state. Serious *absence of such adaptive mirroring* within the attachment context may, therefore, *result in undifferentiated internal affective states, in impoverished awareness of emotional self-states*, and in a tendency to confuse internal mind states with external reality. (p. 300, emphasis added)

Although an infant might form a representation of an emotion through sensitization, this representation could not be brought to consciousness and would be *insufficient* to stand in as a signal for the internal state of the infant, *unless* there would be a second-order representation built from the internalization of the marked parental mirror. If the infant-attuned affect-mirroring environment plays an important role in establishing *differentiated emotion representations* through sensitization to emotion-specific patterns of internal affect cues, how could the absence of internalization of a marked mirroring result in *undifferentiated internal affective states*? It seems unlikely that the sensitized internal-state of an infant might be confused with the internal experience of the caregiver, solely because the parental mirroring remained unmarked.

Emotional Differentiation and Contingency Detection: Internalization of the Consequences of Emotions Unsupported by Social Biofeedback Processes (SBF)

After clearly presenting how representations are formed through the sensitization function of social biofeedback, the authors promote the notion of internalization as being central to their representation-building model. A few questions spring to mind: Why would

the dispositional content of emotions be represented *first*, before infants encounter an innate pedagogical dyadic interaction centered on their emotions that is supposed to sensitize them to emotion categories? Why would social biofeedback processes require internalization mechanisms when biofeedback training does not? And finally, what kind of infant detection mechanism detects markedness? The complexity of the markedness hypothesis seems unnecessary to the sensitization and symbolization of emotions. Maybe there is another kind of signal that could decouple the mirroring from the caregiver and that could be picked-up by contingency detection. It would be a more parsimonious model that could foster the sensitization, differentiation, and representation formation of emotions from biofeedback processes alone.

The authors postulate the existence of an emotion category-discrimination mechanism based on internalization processes, generated prior to encountering social biofeedback for the infant, because they assume that the dispositional content of emotions are *not* available to the infant at birth (Fonagy et al., 2002; Gergely & Watson, 1996, 1999). They seem to believe that infants are indeed born with *indirect* access to non-symbolic representations of the dispositional contents of emotions. They agree that emotions can be conceptualized as "complex pre-wired **behavioral** organisations activated under specific input conditions" (p. 1185; emphasis added). These programs would be likely to "contain **information** about the goal (e. g. removal of obstacle) and the **specific action tendencies** (e. g. approach and attack) characteristic of the given emotion (anger), which could be used to support at least some **predictions** about likely actions" (p. 1185; emphasis added). They

assume that this information "is represented in an **implicit form as procedural knowledge***"* and as such is at first cognitively inaccessible to the infant (p. 1185; emphasis added). Ekman (2003) also contends that some information about emotions and our reactions to experiencing them are innate: "the programs that guide our responses to our varying emotions are not empty when we are born; evolution has written instructions for how we respond and sensitivities for what we respond to" (p. 176). Damasio (2010) concurs: "Emotions are complex, largely automated programs of actions concocted by evolution" (p. 109). Yet, Fonagy et al., as well as Gergely and Watson, do not propose that infants can learn to gain access to the procedural information contained in their own experience through the mirroring of their emotions by the caregiver, even though the stated purpose of biofeedback procedures in general, and social biofeedback processes in particular, is to bring nonconscious self-information to awareness: "As a result of the biofeedback training, the infant will become able to detect and group together the sets of internal-state cues that are indicative of his *categorically distinct* ***dispositional emotion states***" (Fonagy et al., 2002, p. 201, emphasis added).

Research findings mentioned in Fonagy et al. (2002) and Gergely and Watson (1996) raise doubts about their assumption that infants develop the capacity to differentiate emotional expressions, represent the dispositional content of an emotion, and predict someone's behavior, solely by observing their parents' emotional experiences before they engage in social biofeedback processes. Watson (1972, 1979, 1985, 1994) "has provided evidence for the very early existence of a (possibly innate) complex perceptual learning

mechanism (…) [whereby] very young infants are able to detect contingent relations between their responses and external stimulus events" (Gergely & Watson, 1996, p. 1191). Infants' capacity for contingency detection was shown by Watson (1972) to occur in 2 months olds, where infants prefer perfect contingency of the kind arising from actions of the self, such as the perfectly contingent relation between visual and proprioceptive cues that occurs when one is looking at and feeling her own hand movement, for example. This would be true especially until around 3 months of age (Watson, 1994). That period in infant development would represent a transition period between the preferences for perfect contingency and imperfect contingency: "after three months infants are most motivated to explore high but imperfect degrees of response-stimulus contingencies that are typically provided by social objects such as a 'good enough' caretaker" (Gergely & Watson, 1996, p.1191). The preference for imperfect contingency, the relationship between actions of others in relation to the self, occurs reliably around 5 months of age (Barhick & Watson, 1985). Therefore before 3 months of age, infants do not yet prefer contingencies that inform them about outside stimuli, the kind needed to be able to use mirroring information, or to internalize outside information such as the emotional expressions of their caregivers. Since affective mirroring interactions have been studied between caregivers and 2 months-old infants (Legerstee & Varghese, 2001), how could an infant discriminate between emotion categories of the expressions of others through internalization while they prefer the perfect contingency of self behaviors, and before they encounter the social biofeedback processes supposed to sensitize them to these categories? Watson's own observations seem to indicate

that newborns don't yet have the cognitive capacities to discriminate or internalize emotion categories in others, before their preference for imperfect contingencies develop and enable them to use the mirroring behaviors of their caregivers to become sensitive to emotion categories in themselves.

It could be argued, in accordance to Fonagy and his colleague's perspective, that it is social biofeedback processes built on contingency detection that foster emotional category differentiation. While they argue that the contingency detector "builds representations primarily based on stimuli received from the outside" (Fonagy et al., 2002, p. 219), we would contend that the contingency detector uses stimuli from the outside, the caregiver's facial mirroring, to detect inner stimuli that will become represented through biofeedback processes. Infants would form emotion categories through sensitization to their own emotional experiences. They could participate in social biofeedback interactions free of the predictive power of representations of the dispositional content of real parental emotions, while becoming sensitive to the dispositional content of their own emotional experience raised to awareness by the interaction. That would make the need for protecting the infant from mistaking a parental mirror for a real parent emotion, and its potentially harmful consequences, unnecessary.

Representation of the Dispositional Content of Emotions through the SBF

In what follows, we would like to suggest an alternative approach to the sensitization and representations of emotions, their categories, and their dispositional content, to the one proposed by Fonagy et al., and Gergely and Watson. We believe this

alternative model to be more parsimonious, albeit similarly speculative. We hypothesize that infants do *not* internalize the dispositional content of emotions *first,* before encountering the SBF, but gain access to them and represent them *through* the innate dyadic social biofeedback processes based on the infant's contingency detector's actions. This is done by: 1- raising the implicit information about the dispositional content of emotions stored as behavioral procedural knowledge in the infant's emotional experience to the level of consciousness through the SBF function of sensitization, circumscribing the somatosensations arising from the experiencing of an emotion together with other information arising from internal and behavioral consequences of experiencing the emotion. 2- linking information gathered from the parental mirroring interaction with the infant about the emotion, such as how acceptable and modulated it should be, to the somatosensation-representation. And 3- attaching a symbolic component to this somatosensation-representation in the form of the verbal label produced during the PAM, allowing for the verbal symbolization of the emotion. These actions are all based on social biofeedback processes stemming from contingency detection and do not rely on other learning processes such as internalization.

It is conceivable that social biofeedback processes achieve the kind of internalization promoted by developmental psychology in a bottom-up manner, where social interactions become part of the child’s mental functions (learning to understand and think of social interactions in a symbolic manner) when a child, having repeatedly experienced an interaction with another person, subsequently experiences the same

interaction within herself and makes it a part of her understanding of interactions with others in general (Bowlby, 1988). Yet, such internalization is not explained by social biofeedback processes, which aim to teach the infant about her *own inner emotional experience,* and is therefore about **self-detection** (Barhick & Watson, 1985; Fonagy et al., 2002; Gergely & Watson, 1996). Social biofeedback is not 'about' social interactions, even if information about these potentially gets attached to emotion representations in the course of their elaboration. Fonagy et al., and Gergely and Watson, seem to equate the appropriation of emotions and their meaning, fostered by social biofeedback processes, with internalizing processes where external meaning is apprehended as belonging to the self. They seem to have attached to the social biofeedback model notions of object relations theory, in which certain contributors such as Margaret Mahler (Mahler, Pine, and Bergman, 1975) and others hypothesize that the internalization of parental inner states and actions in relation to the infant, in the guise of the 'good' or 'bad' mother, influences the infant's representations of relations between the self and others. Interestingly, Gergely and Watson aim to integrate their model with "current psychodynamic approaches to mirroring developed in object-relations theory" (1996, p. 1200), and postulate that their social biofeedback model of affect-mirroring provides "a kind of 'teaching' or 'scaffolding' environment that results in the *internalization of the maternal affect-regulative function* through the establishment of secondary representations of the infant's primary emotion-states" (emphasis added). This form of internalization is about 'the outer going in', as opposed to the inner becoming explicit. Our understanding of social biofeedback mirroring

is that it promotes an entirely different kind of representation than the ones arising from the internalization of the outside world.

When a subject undergoes biofeedback, **it does not 'internalize' an image of the monitor's graphs and lights, but uses the perception of the changes in the graphs to be used as comparison points with inner changes to better feel them**. The contingency detector uses the parental mirroring as a sensor-beamer, just like a biofeedback machine is a sensor-beamer of implicit inner information. It renders conscious a *somatosensation* associated with the process under study in order to control it. The parent is used as an instrument by the infant, not internalized.

We propose that the SBF, through its sensitization function, brings the formerly procedural dispositional content of an emotion to consciousness together with the set of inner and outer cues found through contingent control of the PAM. Information about the consequences of negative emotional behaviors as gathered through experience with others, or through observation of others, could later enrich the infant's emotion representations, but perhaps only after they would have been formed through social biofeedback.

Contingency Signals: The Infant's Contingency Detection Mechanism Revisited

Covariance

In biofeedback procedures, as in social biofeedback processes, the capacity of the sensor-beamer to vary in tandem with the inner state to be raised to awareness is paramount. Gergely and Watson (1996) state that it is not merely because the parent's

affect-mirroring is contingent upon the infant display of an emotion, but because it *"**co-varies** with the infant's internal dispositional emotion-state* as attributed by the parent, (that) the set of internal and behavioral cues categorised together in the process of the contingency analysis will also be indicative of the infant's emotion-state" (p. 1194; emphasis added). The infant's contingency detector could be said to detect the **covariance** between these changing parental behaviors and infant states. While the contingency detector of the child reduces or augments the set of inner cues tested to find out to what degree they seem to predict the changes of the PAM, the PAM is also transformed by the changes in the infant's emotional display. The covariance between the changes of the PAM with the changes in the emotional display of the infant is ***vital*** if the contingency detector is to achieve contingent control of the caregiver's mirroring and circumscribe the set of cues that the infant will get sensitized to and which will form a sensation-representation of the inner event. The detection of covariance between the parental behavior and the infant's inner experience could *indicate that a biofeedback teaching process is ongoing,* therefore *automatically signaling* 'nonconsequentiality' and 'non-ownership', *decoupling the parental display from the parent, and* ***thus entirely solving the attribution problem*** (whether or not it was marked, and even if infants had somehow already represented the dispositional content of negative emotions before encountering social biofeedback interactions).

The contingency detector might detect contingency between infant and parental behaviors if a caregiver shows up and undertakes face-to-face nurturing tasks or hovers

around when the infant is emotional, for example. But even if the face-to-face interaction is contingent to the infant's emotion expression, *if there is no covariance of the PAM with the infant's inner experience,* social biofeedback processes cannot be successful. If the caregiver cannot accept experiencing the particular emotion to be shared with his infant and avoids mirroring the emotion, or if the caregiver is incapable of sensing the changes in his infant's emotional experience because it strongly provokes in him another emotion (he becomes sad when the infant is angry, or angry when the infant is sad, or angry when the infant is joyful, for example), the dyad will not experience the resonance of covariance. Alternatively, if the parent feels the infant's emotional experience as his own, by fusing with, being overwhelmed by or contaminated by the infant emotion, the dyad could contingently experience the same emotion, without the caregiver covariantly mirroring the infant. The contingency detector would look for covariance, and might even find a little if the caregiver's emotion is overly influenced by the infant's emotional experience. But it would not be the working covariance needed by the contingency detector to be used for the contingency maximizing strategy. Contingent control of the parental emotion expression and behaviors would be impossible, and the contingency system would have to conclude that there is no biofeedback process going on.

The dynamic nature of the SBF is illuminated by the comparison of the covariance in the processes of biofeedback training and the covariance of the processes between the infant's inner experience and the PAM. We propose that the detection of *covariance* between the parental affect-mirroring and the infant's inner and physiological cues by the

contingency detector is a decoupling signal *necessary* to achieve contingent control over the PAM. The nature of covariance implies the existence of a corresponding principle, without which it could not exist: the invariance principle. Invariance is evident when studying a biofeedback machine: parts of the machine covary with the subject connected to it, while parts are invariant. Parts of the subject also remain invariant while some parts covary with the graphs on the machine's monitor. There cannot be covariance of the machine and the subject on a 1:1 ratio; otherwise they would have to be the same. It is similar in the parent-child dyad: while social biofeedback processes require them to connect and covary to realize pedagogical developments, certain structures such as the contingency detector must rise out of the invariant part of the child to detect contingency and covariance. It also requires the infant-invariant part where it anchors the detected set of inner and outer cues used for representation formation. The parent also must remain partly invariant in order to succeed in existing while mirroring.

Invariance

While covariance detection is posited as a necessary decoupling component preceding contingent control, we wonder whether it is *sufficient* for the contingency detector to decouple the PAM from the parent and achieve control of the parental display. Why is **invariance** important to our analysis? It could be important as a decoupling signal revealing to the child that, while certain parts of the parental display might be about the child, certain parts are about the parent or, in fact, *are* the parent. It decouples the parent from the parental mirror and the infant, although they are both in a dyadic interaction where

it is difficult to know where one ends and the other begins. The existence of a parental invariance from the PAM is crucial: if the parent remains emotionally stable when faced with his infant's emotional experience, he offers security to the child by implicitly signifying that the dyad is okay even if the infant is in the middle of an emotional storm. For example, if an infant is experiencing fear and the parent is mirroring the infant's fear, the caregiver has his own emotion about how he feels in relation to the situation, which includes both the stimuli that has induced fear in the infant, as well as how he feels about being in the social biofeedback interaction. If the situation is not scary to the parent, then the parental inner feeling of calm, for example, which would represent the parental invariance, could be detected by the infant's contingency detector as the part of the interaction offering the *contrast* from which the covariance between the parental display with the infant emotion can be better perceived. Mirroring a positive emotion calmly would achieve a similar goal, where the parental invariance might be used to contrast the shared emotion and help in its modulation as well. The parental feelings while participating in social biofeedback might be similar to Damasio's background emotions, one of the three levels of emotions he considers (1999). He reports that the label 'emotions' has been attached to behaviors that extend beyond the 'primary or universal emotions of happiness, sadness, fear, anger, surprise, or disgust' and includes 'the secondary or social emotions such as embarrassment, jealousy, guilt, and pride', as well as the background emotions:

> When we sense that a person is 'tense' or 'edgy', 'discouraged' or 'enthusiastic', 'down' or 'cheerful', without a single word having been spoken to translate any of

> those possible states, we are detecting background emotions. We detect background emotions by subtle details of body posture, speed and contour of movement, minimal changes in the amount and speed of eye movements, and in the degree of contraction of facial muscles. (p.52)

These kind of feelings, which a parent must have even as they share in their child's emotional experiences, could participate in representation formation as the contrast to the infant's own emotion, easing perception of the covariance between the mirroring and the infant's inner cues. It might also add to the representations formed by contributing information pertaining to the familial acceptability of expressing such an emotion, in particular helping to modulate them.

According to Damasio (1999), these background emotions, experienced as background feelings, 'help define our mental state and the color of our lives' and are called thus because, while we may be acutely aware of them and attend to them, we may also attend to other mental content and let them retreat from the foreground of our mind. Being able to do so could allow a parent to participate in a dyadic interaction such as social biofeedback while experiencing his own emotions: "Prominent background feelings include fatigue, energy, excitement, wellness, sickness, tension, relaxation, surging, dragging, stability, instability, balance, imbalance, harmony, discord" (p. 286). These sometimes mild, sometime intense emotions let us "sense the general physical tone of our being". Others can perceive them in the way we carry ourselves, in the way we move, and "even

the tone of our voices and the prosody in our speech as we communicate thoughts that may have little to do with the background emotion" (p. 286).

The signals forming the background emotions are there even as we attend to and experience a foreground emotion (Damasio, 1999). Parental background emotions may signal to the child the difference between her own inner emotional world and an emotional world found within another being in the outer world, and how it is possible to have our own emotional experience, even as we share in someone else's emotions. This would also connect with the work of Winnicott (1969) and his observations on the importance of the survival of the mother in the face of her child's negative emotions aimed towards her, such as anger, for example. If a caregiver cannot share in an infant emotion without remaining somewhat distinct or invariant, then infant emotional experiences will be threatening to the dyad's equilibrium and, by extension, to the child, to say nothing of the consequent difficulties of engaging in vital social biofeedback processes.

In fact, the parent might have his inner emotional landscape influenced by the interaction, by being tense for example (a background emotion). As long as the parent accepts this as his own experience, while allowing the child to experience and express her emotional experience, the parent is promoting invariance in the dyad. It offers security by promoting respect for the differentiation of the dyadic partners, even while they are partly connected by the co-variance principle at the heart of the biofeedback transaction. The parental invariance therefore promotes and protects the infant invariance, and could also acts as a decoupling signal signifying 'what doesn't covary with you is me, what covaries

with you is about you, and what doesn't covary in you is you', allowing the circumscribed sensation to be anchored in the infant to be used for representation formation. Because covariance cannot exist without the corresponding principle of invariance, we propose to refer to them together as the covariance-invariance principle.

Covariance-invariance and the Decoupling of the Parental Mirroring

A parent producing a PAM in response to his infant's emotion would have it be immediately detected by the infant's contingency detector, since the ostensive cues accompanying the PAM would automatically trigger the infants' pedagogical stance. Because the parental mirroring is produced as 'a response to the infant's corresponding emotion', the covariance of the mirroring to the infant's changing expression needs to be found for the social biofeedback to succeed. We hypothesize that it is the infant's contingency detector that decouples the PAM from the parent, upon detection of covariance-invariance between the changes in the infant's inner experience and the changes in the parental mirroring. If the infant contingency detector detects covariance of the PAM with the infant's inner state, it automatically decouples it from the parent, **whether the mirroring is 'marked' or not**. If a parent contingently mirrored their infant's anger without marking it, the contingency detector would start its covariance detection, which it would find since the PAM, produced as a result of the infant's emotional experience, would covary with the infant's emotional expression. The contingency detector would conclude that a biofeedback process is ongoing and would decouple the PAM from the parent. Once it has achieved contingent control of the parental mirroring, thus circumscribing all the

somatosensations forming an emotion-category, a representation is formed from the global sensation that needs to be anchored in the infant.

Contingent Control of the Parental Mirroring and Anchoring

The last social biofeedback mechanism to be revisited is that of the anchoring of the parental mirroring in the infant. The contingent control the infant has on a parental display differs when it is a mirroring or the display of a real parental emotion. The infant detection module could not contingently control a real parental emotion (sadness, for example), since it would probably be provoked by an external or a parental inner event, rather than being a reflection of the infant's inner state (Gergely & Watson, 1996). A parental mirror that is part of social biofeedback processes would automatically be "under the contingent behavioral control of the baby, as it is produced as a response to the infant's corresponding emotion expression during affect-regulative mirroring interactions" (Gergely & Watson, 1996, p. 1199).

We hypothesize that the realization of contingent control over the parental mirroring by the infant's contingency detector anchors the biofeedback experience in the infant. Reaching contingent control over the parental behavior, by circumscribing every infant inner cue that covaries with the parental mirroring, could be enough to signal to the infant's contingency detector that it possess all the information used for sensitization to the emotion and required for representation formation. Inversely, a marked parental behavior that would not be about the child (such as using motherese to tell a bedtime story, or using it while greeting or playing with the child, for example) would therefore not be covariant with the

infant's inner state, leading the infant's contingency detector to conclude that there is no biofeedback processes taking place. The parental display would be attributed to the parent. Gergely and Watson ask the question "How does the baby come to know that the dispositional state expressed by the external emotion display *he/she seems to be controlling* belongs to himself/herself rather than to the parent who is, after all, expressing it?" (1996, p. 1197; emphasis added). The fact that the infant is **controlling a parental behavior** could be the signal leading to the anchoring of the detected information in the infant.

When the parental behavior is a true mirroring of the infant's emotion, covariance-invariance detection can be used as a decoupling signal, and achieving contingent control of the parental mirroring can be used as an anchoring signal by the infant's contingency detector, since it has now circumscribed all the cues used for sensitization and representation formation through the biofeedback 'loop' connecting them together.

Discussion

After revision, the social biofeedback model continues to be an exciting theory of representation formation, built on the somatosensations of infant emotions and their sensitization. It fosters the differentiation of the emotions, as well as their representation and symbolization entirely through the mediation of the infant's contingency detector, without raising any dangers of misattribution during social biofeedback interactions. The model illustrates how the inner body feelings of emotions play a paramount role in the elaboration of emotion representations and their symbolization. Dyadic interactions are innately set up to help the infant become sensitive to, differentiate, and circumscribe these

somatosensations, raise them to consciousness and become informed by them when 'feeling' them. The emotion, during successful dyadic biofeedback interactions, undertakes a journey from an aggregate of undifferentiated somatosensations, to sensitivity-based differentiation, to sensory representation, all the way to symbolization, entirely through the mediating mechanism of infant contingency detection.

In this perspective, markedness of the parental mirroring might be better apprehended as an ostensive cue purposed to constrain infant attention towards the dyadic interaction in which it is found. Markedness of the voice and facial display of the caregiver would signal to the infant that a pedagogical interaction is in progress, to pay attention and have learning detection mechanism at the ready. Alternatively, a possible function of markedness could be to signal to the infant that the parent's emotional state is open and receptive, even benevolent, to the infant's expressed emotion, and that it is therefore safe to share inner states, as signaled through the prosody of the caregiver's voice during mirroring. Damasio (1999) explains how the prosody of the voice signals the state of a person's background emotions, and therefore, of his general state in the here-and-now:

> Even when the observed subject speaks, emotional aspects of the communication are separate from the content of the words and sentences spoken. Words and sentences, from the simple "Yes," "No," and "Hello" to "Good Morning" or "Good-Bye," are usually uttered with a background emotional inflexion. The inflexion is an instance of prosody, the musical, tonal accompaniment to the speech sounds that constitute the words. Prosody can express not just background emotions, but

> specific emotions as well. For instance, you can tell someone, in the most loving tone, “Oh! Go away!” and you can also say, “How nice to see you” with a prosody that unmistakably registers indifference (Damasio, 1999, p. 92)

Such prosody accompanying the parental mirror could be used to signal ‘positiveness’, ‘benevolence, or ‘acceptance’, even while mirroring a ‘negative’ emotion such as sadness, anger, or disgust. Markedness by the caregiver of the affect-mirroring could signal to the infant that it is okay to seek emotional proximity to the caregiver, a proximity that is necessary for the emotional connection required of social biofeedback interactions. Thus, the parent’s markedness could signal to the infant that affective communication is occurring in a secure attachment context. A last hypothesis could be that motheresed verbalizations can offer linguistic material for verbal-symbolic representations, through the ‘word salience’ of markedness. Words spoken in such prosody could be more easily used for verbal labels giving rise to symbolic representations.

While markedness of the parental mirroring probably plays a contributing role to the pedagogical interaction in which social biofeedback is embedded, it is found by the revision to be unnecessary to social biofeedback processes per se. Which is not to say that caregiver behavior in the social biofeedback model is not paramount, but their importance stems more in terms of the caregiver’s ability to act as an external feedback pathway, a sensor-beamer, for the infant’s detection mechanisms. The caregiver’s required capacities as a sensor-beamer are essential, multiple and complex: to let a part of himself feel and resonate in real time with the infant’s emotional experience and its changes. This includes

emphatically allowing his physiology to be transformed by sharing in the infant's emotion, experiencing the infant's emotion as a foreground emotion while sensitively echoing her changing emotional experience, and maintaining invariance by keeping his own background emotion distinct from hers (remaining relaxed, stable, or balanced while she becomes tensed with distress, for example): these probably innate and mostly unconscious behavior and interactions seem necessary to the raising of emotional sensations and their meaning to consciousness in the infant. Social biofeedback might be the 'emotion-based mechanism' suspected by DeOliveira et al. (2004) of being responsible for "the fundamental attachment of meaning to signals of affects" which could lead to pathology when unsuccessful.

Difficulties of covariance or invariance of the parental affect-mirroring could be responsible for the pathological consequences of defective mirroring formerly attributed to difficulties of markedness. A parent that could not surrender to the covariating mirroring needs of the infant in regards to avoidance of a particular emotion as a consequence of trauma, culture or personality, would preclude the infant's contingency detector from finding the infant inner cues to impact the parental behavior, thus preventing the sensitization necessary to representation formation. Because caregivers can experience physiologically their infant's emotion while mirroring (through both empathy and the correspondence that exists between making the facial emotion expression and feeling the emotion) (Ekman, 2003), some might be inclined to avoid altogether the social biofeedback interaction when the infant is experiencing an emotion they do not wish to experience. If

the parent hovers around the infant waiting for the negative emotion to pass, the contingency detector would look for contingency between the inner cues present when the caregiver appears in the vicinity of the child, seeking out those cues that provoke the caregiver to come to the infant. If the caregiver hovers or offers face-to-face care without mirroring the infant's emotion, the contingency detector would search for covariance between the infant inner cues present in the child at the appearance of the caregiver and the caregiver's face. It would gradually manipulate each of the infant's inner cues looking for covariance with the parental presence. Finding no cues that would covary with the parental facial expression (in the absence of mirroring), the contingency detector would gradually reduce the set of infant inner cues, looking for the particular one that summoned the caregiver to the infant. It could thus reduce the infant's emotional expression until achieving total extinction of the infant's emotional display. This would leave the child with very little means of apprehension of the unreceivable emotion-sensations, and poor representations of her inner world. Such a pathological dyadic interaction in the face of negative emotions could leave the infant vulnerable to issues of denial of inner states and over-independence when experiencing emotions. That is because certain emotions cannot be shared with another and become sensitized to, but rather must be endured alone. And because the somatosensations arising out of the experiencing of an emotion cannot be entirely suppressed, dissociation can also be used as a defense against the unaccepted experience, producing somatizations when such emotions are activated again throughout the individual's life, as well as leaving behind 'unformulated experiences' (Stern, 1997).

These unformulated experiences would remain unsymbolized due to the absence of parental mirroring behavior, yet still hold the potential to become articulated through successful social biofeedback interactions.

Alternatively, a parent that could not remain inwardly invariant when faced with an infant emotion, but that would be overwhelmed or contaminated by the infant experience, could produce the *appearance* of an affect-mirroring (a face-to-face expression of the same emotion). The contingency detector could find some covariance between the parental display and the infant's inner experience, since the caregiver' expression would be a matching parental emotion directly provoked by the infant's emotion. Thus the contingency detector might conclude that the interaction is about the infant. But, in a bid to circumscribe the set of inner cues responsible for the changes in the parental display to try and achieve contingent control, it would use the contingency maximizing strategy and find covariance between so many infant inner cues and the parental response that it would extend the set of possible infant inner cues tested for covariance, provoking a corresponding increase in the parental emotional experience and the infant's emotional response, further distressing the dyad. Contingent control of the parental display would be impossible, since it would not be a true parental mirroring, leaving the infant to become potentially overly activated by the sensations of the emotion through the repetitive escalation and intensity of the dyadic exchange in search of covariance, but without enabling the anchoring of the experience in herself, or the capacity to represent or inform herself through a representation of the emotion circumscribed through contingent control of the parental display. Such a

pathological dyadic interaction in the face of negative emotions could leave the infant vulnerable to issues of fusion and dependency when experiencing emotions, since emotions can be seemingly shared with another but not properly represented as a signal of self-detection, leaving the child dependant on others to know about her inner states, to regulate herself and, ultimately, to help her resume developmentally incomplete social biofeedback interactions. Other difficulties of mirroring could be encountered when the infant experiences negative social emotions such as shame and guilt, for example, since it can be hypothesized that parents inducing shame or guilt in their child do not simultaneously mirror their infant's shame or guilt. That is because either these emotions reject the infant as 'not worthy' or 'good enough', temporarily inhibiting the necessary parental receptivity towards the infant required of social biofeedback parental mirroring behavior. Their own experiences with shame or guilt could also keep them from mirroring such emotions in their child.

A last consequence of parental difficulties with covariant-invariant mirroring might include difficulties of selfhood and agency. Watson (1994, 1995) "proposed that one of the **primary functions** of the contingency-detection mechanism is *self-detection*" (Fonagy et al., 2002, p. 166, emphasis added). Consequent to healthy covariant-invariant mirroring, the *self-detection function* of the SBF is enhanced through *the sensitization* to visceral feelings fostering the appropriation of the inner body as referring to the self; through the *representation and symbolization* allowing for a communicative self-referential symbolic perspective that makes inner content more accessible and more defined; through *the*

anchoring of the representation in the part of the infant not covarying in the feedback connection (invariance), thus promoting separation and autonomy from the caregiver, and maybe even the *formation of self-representations*; through the *contingent control of the mirroring*, fostering the ability to regulate self-states and the promotion of a sense of causal efficacy and agency; and lastly, by the raising of the feelings of emotions to consciousness, thus constructing the self (Damasio, 1999, 2010). Fonagy et al. contends "Contingency detection may have a key role to play in several forms of psychopathology that involve the malformation of the self as agent" (2002, p. 248). Any difficulties of covariance-invariance of the mirroring would therefore have a major impact on the building of the self-structures.

Concluding Remarks

The revised model proposed by the authors is designed to enhance and build on the internal logic of the social biofeedback theory of parental affect-mirroring. It makes the model more parsimonious. The revision also opens the model to a wider range of clinical applications, for instance to the therapy of adults, by placing the use of 'therapese' in its proper context— useful but not necessary to the sensitization and symbolization of the emotions in adults. Although some studies show that infants deprived of key interactions during their early development fail to recoup their losses if subsequently placed in nurturing environments later than the age of six months (suggesting an critical period for the acquisition of certain capacities) (Rutter, M., 1998), many authors believe that repair can be achieved with targeted, specialized interventions, even in adulthood (Bateman & Fonagy, 2012, 2004, 2003; Schore, 1994). Therapists who can act as sensor-beamers by

sensing and resonating with the changes in the patient's inner emotional states, while keeping their own background emotion distinct from the foreground emotion shared in the dyad as demonstrated by a display of corresponding covariant-invariant mirroring, could help patients repair capacities for emotion sensitization and symbolization that were damaged or never fully formed during early development. This will be the theme of the article found in the following chapter.

Although based on biofeedback training research and John Watson's strong research on infant contingency detection, the social biofeedback theory of parental affect-mirroring is speculative and is recognized by its authors as such. The social biofeedback model is therefore just as speculative. Hopefully, the heuristic value of the streamlined version will inspire more research into the somatosensations of emotions and their meaning. Not just their dispositional meaning, but also their meaning as signals to the self that help optimize agency: the meaning of the 'feeling of the emotion' in relation to the inner and psychological homeostasis of the individual. The SBF model might also be useful for furthering the comprehension of the dyadic interactions that promote interoceptive sensitivity, self-detection, and consciousness. Healthy social biofeedback interactions seem to foster a balanced awareness of inner and outer experiences. These could hold promising avenues of inquiry for therapeutic interventions aimed at the repair of emotions poorly sensitized and represented in infancy. The model could also help open new avenues of research into the links between our capacities to feel and our capacities to think. While contemporary fields of research and clinical endeavors focus on the contribution of the

caregiver or therapist's thoughts about the infant or patient's mental structures for their acquisition of the capacity to think about mental states, the SBF model suggests it is the caregiver's ability to *sense and feel* the infant's inner world and its changes which enables the infant to sense and feel her emotions, to represent and become conscious of her inner world, and to eventually think about inner worlds, leading to an appreciation of the inner world of others. When it comes to emotions, the ability to sense and feel would be the gateway to the ability to think.

References

Bahrick, L. R. & Watson, J. S. (1985). Detection of intermodal proprioceptive-visual as a potential basis of self-perception in infancy. *Developmental Psychology*, *21*: 963-973.

Bateman, A. & Fonagy, P. (2003) The development of an attachment based treatment program for borderline personality disorder. *Bulletin of Menninger Clinic, 67*(3), 187-211.

Bateman, A., & Fonagy, P. (2004). *Psychotherapy for borderline personality disorder: Mentalization-based treatment*. Oxford: Oxford Univ. Press.

Bateman, A., & Fonagy, P. (2012). *Handbook of mentalizing in mental health practice.* Washington, DC: American Psychiatric Pub.

Bowlby, J. (1988). *A secure base: Parent-child attachment and healthy human development*. Tavistock professional book. London: Routledge.

Campbell, N. A., & Reece J. B. (2005). *Biology*, 7th ed. San Francisco: Pearson Education.

Csibra, G. & Gergely, G. (2006). Social learning and social cogniton: The case for pedagogy. In Y. Munakata & M. H. Johnson (Eds.), *Processes of change in brain and cognitive development: Attention and performance XXI* (pp. 249-274). Oxford: Oxford University Press.

Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness*. New York: Harcourt Brace.

Damasio, A. R. (2010). *Self comes to mind: Constructing the conscious brain*. New York: Pantheon Books.

DeOliveira, C. A., Bailey, H. N., Moran, G., & Pederson, D. R. (2004). Emotion socialization as a framework for understanding the development of disorganized attachment. *Social Development*, *13* (3), 437-467.

Ekman, P., Levenson, R. W., & Friesen, W. V. (1983). Autonomic nervous system activity distinguishes among emotions. *Science, 221*, 4616, 1208-10.

Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion, 6*, 169-200.

Ekman, P. (2003). *Emotions revealed: Recognizing faces and feelings to improve communication and emotional life*. New York: Times Books.

Ferguson, C. A. (1964). Baby talk in six languages. *American Anthropologist*, *66*: 103-114.

Fernald, A. (1991). Prosody in speech to children: Prelinguistic and linguistic functions. In: R. Vasta (Ed.), *Annals of children development*, Vol. 8 (pp. 43-80). London: Jessica Kingsley.

Fernald, A. (1992). Human maternal vocalizations to infants as biologically relevant signals: An evolutionary perspective. In: L. C. J. H. Barkow and J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 391-428). Oxford: Oxford University Press.

Fonagy, P. (2003). The development of psychopathology from infancy to adulthood: The mysterious unfolding of disturbance in time. *Infant Mental Health Journal*, *24*(3), 212-239.

Fonagy, P. (2010, January). *Mentalization and its link to therapeutic alliance: A case for mentalization as common factor in therapeutic change.* Presentation at the American Psychoanalytical Association Conference, New York, NY.

Fonagy, P., Target, M., Gergely, G., Allen J. G. & Bateman, A. (2003). The developmental roots of borderline personality disorder in early attachment relationships: A theory and some evidence. *Psychoanalytic Inquiry*, *23*, 412-459.

Fonagy, P., Gergely, G., Jurist, E.L., & Target, M., (2002). *Affect regulation, mentalization, and the development of the self*. New-York, Other Press.

Fonagy, P., Gergely, G., & Target, M. (2007). The parent-infant dyad and the construction of the subjective self. *Journal of Child Psychology and Psychiatry*, *48*:3/4, 288-328.

Gergely, G. (2007). The social construction of the subjective self: the role of affective-mirroring, markedness, and ostensive communication in self-development. In: L. C. Mayes, P. Fonagy, and M. Target (Eds), *Developmental science and psychoanalysis: Integration and innovation* (pp 45-82). London: Karnac.

Gergely, G. & Csibra, G. (2006). Sylvia's recipe: The role of imitation and pedagogy in the transmission of human culture. In: N. J. Enfield & S. C. Levinson (Eds.), *Roots of human sociality: Culture, cognition, and human interaction* (pp. 229-255). Oxford: Berg Publishers.

Gergely, G. & Watson, J. (1996). The social biofeedback theory of parental affect-mirroring : The development of emotional self-awareness and self-control in infancy. *International Journal of Psycho-Analysis 77*,1181.

Gergely, G., & Watson, J. (1999). Early social-emotional development: Contingency perception and the social biofeedback model. In P. Rochat (Ed.), *Early social cognition: Understanding others in the first months of life* (pp. 101-137). Hillsdale, NJ: Erlbaum.

Izard, C. E. & Malatesta, C. Z. (1987). Perspectives on emotional development. In J. D. Osofsky (Ed.), *Handbook of infant development* (2nd ed., pp. 494-554). New York: John Wiley.

Krause, R. (1997). *Allgemeine psychoanalytische Krankheitslehre. Grundlagen.* Sttutgart: Kohlhammer.

Lachman, Frank M. (2001). Some contributions of empirical infant research to adult psychoanalysis: What have we learned? How can we apply it? *Psychoanalytic Dialogues*, *11*(2): 167-185.

Legerstee, M., & Varghese, J. (2001). The role of maternal affect mirroring on social expectancies in three-month-old infants. *Child Development, 72*, 5, 1302-1313.

Mahler, M. S., F. Pine, and A. Bergman (1975). *The Psychological Birth of the Human Infant*. NY: Basic Books.

Meltzoff, A. N. & Gopnik, A. (1993). The role of imitation in understanding persons and developing a theory of mind. In *Understanding other minds: Perspectives from Autism*, ed. S. Baron-Cohen et al. (pp. 335-365). Oxford: Oxford Univ. Press.

Miller, N. E. (1978). Biofeedback and visceral learning. *Annual Review of Psychology*, *29*, 373-404.

Nishimura, C., Wang, L., Nagase, A., Terada, K., Miyamoto, Y., Tsukuma, H., & Muro, M. (2007). A learning model of autonomic function in biofeedback. *International Congress Series*, *1301*, 119–122.

Rutter, M. (1998). Developemental catch-up, and deficit, following adoption after severe global early privation. *Journal of Child Psychology and Psychiatry, 39*, 4, 465-476.

Schore, A. N. (1994). *Affect-regulation and the origin of the self: The neurobiology of emotional development*. Hillsdale, N. J. : L. Earlbaum Associates.

Snow, C. E. (1972). Mother's speech to children learning language. *Child Development*, *43*, 549-566.

Solms, M. & Turnbull, O. (2002). *The brain and the inner world*. New York, Other Press.

Stern, D. B. (1997). *Unformulated experience: From dissociation to imagination in psychoanalysis.* Hillsdale, NJ: Analytic Press.

Stern, Daniel N. (1999). Vitality contours: The temporal contour of feelings as a basic unit for constructing the infant's social experience. In P. Rochat (Ed), *Early social cognition: Understanding others in the first months of life*. Lawrence Erlbaum Associates Publishers, (pp. 67-80). Mahwah, NJ.

Stern, D., Spieker, S., Barnett, R., & Mackain, K. (1983). The prosody of maternal speech: Infant age and context related changes. *Journal of Child Language*, *10*, 1-15.

Stern, D. N., & Boston Change Process Study Group (2006). Some implications of infant observations for psychoanalysis. In A. M. Cooper (Ed), *Contemporary*

psychoanalysis in America: Leading analysts present their work, (pp. 641-666). Washington, D.C. American Psychiatric Publishing.

Watson, J. S. (1972). Smiling, cooing, and 'The Game.' *Merrill-Palmer Quarterly*, *18*, 323-339.

Watson, J. S. (1979). Perception of contingency as a determinant of social responsiveness. In E. B. Thoman (Ed.), *The origin of the infant's social responsiveness*, (pp. 33-64). New York: Erlbaum.

Watson, J. S. (1985). Contingency perception in early social development. In T. M. Field and N. A. Fox (Eds.) *Social perception in infants*, (pp. 157-176). Norwood, N. J.: Ablex Pub. Corp.

Watson, J. S. (1994). Detection of self: The perfect algorithm. In S. T. Parker, R. W Mitchell, and M. L. Boccia (Eds.) *Self-awareness in animals and humans: Developmental perspectives*, (pp. 131-148). New York: Cambridge U. Press.

Watson, J. S. (1995). Mother infant interaction: Dispositional properties and mutual designs. In N. S. Thompson (Ed.) *Perpectives in ethology*, Vol. 11: Behavioral design, (pp. 189-210). Plenum Press, New-York, NY.

Winnicott, D.W. (1969). The use of an object. *Int. J. Psychoanal.*, *50*: 711-716.

Chapitre 3 - Sensitization to emotions and representation formation in adult psychotherapy: A clinical illustration of the revised social biofeedback model

Short Title: The revised social biofeedback model

Sensitization to emotions and representation formation in adult psychotherapy: A clinical illustration of the revised social biofeedback model

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Sensitization to emotions and representation formation in adult psychotherapy: A clinical illustration of the revised social biofeedback model

Abstract

A revision of the social biofeedback model (SBF) based on the model of social biofeedback theory of parental affect-mirroring of Gergely and Watson (1996) is applied to the psychotherapy of adults. A clinical vignette illustrates the social biofeedback interaction and its contribution to the change process. Links are made between the Boston Change Process Study Group's perspective on the change process and the model's, showing them to be compatible with one another but at different levels of the change process: the SBF, through mirroring interactions, fosters self-detection through implicit intrapsychic mechanisms (ways of being with self), while the Boston Group focuses on changes in more interpersonal structures (ways of being with others). The study suggests that empathically sharing the patient's changing emotion while experiencing one's own emotional perspective on the interaction fosters the covariance-invariance mirroring necessary for the patient's contingency detection mechanisms to sensitize and represent the somatosensations accompanying an emotion, used in self-detection. The therapist's attention to the local level of interaction, including his own somatosensory field, combined with the capacity to surrender to being used as a biofeedback object are essential to the model's therapeutic action. The SBF model is implicitly at play in relational psychodynamic approaches but they tend to overlook the specific processes at the heart of self-detection.

Keywords: Emotion, sensitization, symbolization, self, change, mirroring, somatosensations.

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Introduction

Emotions might be undifferentiated somatosensory events in infants. A special pedagogical interaction with a caregiver would be necessary to help an infant develop sensitivity to inner states such as emotions and learn to categorize and represent them. Gergely and Watson (1996) have expounded a theory of social biofeedback in which, through the caregiver's innate propensity to act as a biofeedback entity, the infant receives information about the somatosensations she is experiencing, until she becomes sensitive to the grouping of the inner cues signifying the presence of a given emotion. Awareness of the differentiated sensations indicative of the emotion she is experiencing will develop, enabling her to detect, appropriate, and represent her emotion (Gergely & Watson, 1996, 1999). A verbal label produced by the caregiver during the social biofeedback process would be used by infant mechanisms to attach a symbolic component to the representation of the emotion, promoting communication to self and others (Fonagy, Gergely, Jurist & Target, 2002). The sensitization of emotion processes would also participate in the building of self-structures through self-detection (Fonagy, et al., 2002).

The social biofeedback theory of parental affect-mirroring (Gergely & Watson, 1996), based on Watson's infant contingency detection research (1972, 1979, 1985, 1994), and furthered by Fonagy, Gergely, Jurist and Target (2002), postulates a complex biosocial system where parents would participate in the sensitizing of the infant's emotions by acting as a biofeedback pathway measuring the infant's changing emotional experience and

displaying the information back to the infant in the shape of a mirroring of the infant's emotional expression. Infant mechanisms detecting contingent relations between changes in the infant's inner experience and changes in the parental mirroring display would be instrumental in bringing the emotion to consciousness. A special feature of the model, 'markedness' of the parental mirroring, was proposed by Gergely (1995 a, b), and deemed necessary for emotion representation formation (Fonagy et al., 2002). Markedness includes 'motherese', or 'parentese' as seen in recent contributions, the singsong voice used by caregivers when addressing their infant during certain interactions and the exaggerated facial features of the parental-mirroring of the infant's emotion. Markedness was hypothesized to help the infant recognize the parental mirror as displaying not the parent's emotion, but her own, and to help her internalize the parental facial display to be used for representation building. Unmarked parental mirroring was hypothesized by the authors to be responsible for infant emotional difficulties: the "baby's feelings will be unlabeled, confusing, and experienced as unsymbolised and therefore hard to regulate" (Fonagy et al., 2003, p. 427), for infant pathology of "deficiency in self-perception and self-control of affects" (Fonagy et al., 2003, p. 435), and a weakened capacity for attentional control (Fonagy, Target, & Gergely, 2006). Other researchers have hypothesized that 'unmarked' parental affect-mirroring might foster dysfunctional emotional processes giving rise to the development of disorganized attachment (DeOliveira, Neufeld Bailey, Moran & Pederson (2004). Gergely and Watson proposed that dyadic social biofeedback exchanges might play a role in the therapeutic process as a mediating mechanism that would contribute to psychic structure building and to the emergence of emotional self-awareness and control in infants (1996).

The model would also be applicable to the understanding of the change process in adult therapy since the information processing mechanism of contingency detection at the core of social biofeedback processes could be active 'over the lifespan' of an individual, and "emphatic affect-reflective gestures are characteristic of adult communication as well as of parent-infant interactions" (Gergely & Watson, 1996, p. 1203). According to these authors, "emotional mirroring can be identified as a potentially central mechanism of therapeutic change in child psychotherapy and it has been demonstrated to characterize face-to-face patient-therapist interactions in adult psychotherapy as well" (Gergely & Watson, 1996, p. 1203). The markedness hypothesis weakened the social biofeedback model's applications to adult psychotherapy, given that neither the marking of the parental mirroring through the high-pitched singsong prosody of 'motherese' (or 'baby talk') of the caregiver's verbalizations during parental mirroring, nor the facial emphasis accompanying it, translate as 'patient talk' in therapy with adults. Still, Fonagy et al., (2002) advanced that "the formal features of the psychoanalytic setting as well as the rules of conduct specified in the analytic contract can be interpreted as establishing salient features of markedness that clearly distinguish the use of language in the analytic discourse from its everyday use in communicative exchanges" (p. 314). More recently, Fonagy (2010) has designated by 'therapese' the markedness that would be produced vocally by a therapist, for instance by calmly mirroring her borderline patient's highly aroused inner state.

A process of sensitization and symbolization of the emotions evidently occurs in the effective treatment of adults. According to Gergely and Watson's original model, markedness would be used by the patient for decoupling the therapist from his facial

emotional expression, to use the residual facial expression as an external representation of the patient's emotional experience. A generalization of the markedness function to the whole psychoanalytic setting fails to account for the specific dyadic conditions necessary for decoupling to occur. According to Gergely, Koos, and Watson (2002), it is the facial and vocal *exaggeration* of the parental mirroring that decouples the parental presentation from the parent. Thus, in an adult clinical setting, markedness would more likely be produced by the calm voice ('therapese') or facial expression of the therapist. However, the manner of expression of the therapist can hardly be considered to be the exaggerated emotional signal necessary for prompting decoupling. We agree that the therapist's subdued expression of emotion during the discussion of the patient's intense emotion can have a calming effect, but it can't be maintained that this "calmness" is necessary for preventing the patient from confusing her emotional experience reflected on the therapist's face with his real emotion expression. We have shown that the supposed decoupling effect of markedness can be explained by other mechanisms that intervene in the therapy of adults and also account for the benefits of the therapist being different from the patient (e.g. calm instead of upset), and not necessarily manifesting an exaggerated version of the patient's experience (see discussion on invariance below and in Pellerin & Lecours, 2012).

We have demonstrated that the social biofeedback theory could be retained as the essential model for sensitization and symbolization of emotions even when modified by removing the markedness hypothesis (Pellerin & Lecours, 2012). This revised model is presented further in this paper as the social biofeedback model (SBF). Social biofeedback without the markedness hypothesis is, in fact, implicitly a part of or compatible with, many

theoretical models of the change process in adult psychotherapy. The Boston Change Process Study Group's theory of the change process was chosen to illustrate this proposition (BCPSG: 1998, 2002, 2005, 2007, 2008). The BCPSG conceptualizes the change process as stemming from dyadic interactions in different terms than those used in the SBF model. Yet, change from their perspective also originates in shared emotions, mirroring behaviors and implicit representations, and will be used to contrast social biofeedback processes of emotion sensitization through a clinical vignette originally interpreted with their model. The vignette is not available in a video format and is therefore considered second-hand material. The BCPSG's model will be briefly reviewed before presenting the vignette, which will then be re-interpreted with the revised social biofeedback model.

The Social Biofeedback Model (SBF)

Social biofeedback processes, like biofeedback procedures, help an individual develop sensitivity to implicit inner emotion cues forming an *emotion category*, through the external feedback pathway provided by the resonating parent. Becoming sensitive to the inner sensations of an emotion enables the capacity to be informed by its presence and meaning, to be used for communication. Since “this first communication system continues to operate throughout life” (BCPSG, 1998, p. 916), emotions are therefore its building blocks and their dyadic sensitization and elaboration are essential to the development of the capacity to be informed as to their meaning for communication to the self, others, and the world.

Biofeedback procedures are essentially “an acquisition technique of self-regulation ability of an autonomic function, of which we are normally unaware, through a series of

training aided by an additional outer feedback pathway" (Nishimura et al., 2007). Biofeedback brings to consciousness the visceral sensations linked to an implicit inner process by making them sensitive through the help of a sensor-monitor. Social biofeedback processes, as expounded in the revised model (Pellerin & Lecours, 2012), work similarly: as an emotion is triggered in an infant, a set of somatosensations arises in her, accompanied by proprioceptive cues. This automatically triggers a facial and behavioral expressive display of the emotion category, such as anger for example (Ekman, 2003; Gergely & Watson, 1996). This infant display triggers the parental mirroring response, which itself triggers a responsive stance in the infant (Csibra & Gergely, 2006). The caregiver "who can read and interpret" the emotional inner state of the infant is the external biofeedback entity (the sensor-beamer) (Gergely & Watson, 1996, p. 1193). Sharing in her emotion through empathy, in which mirror neurons might play a role (Damasio, 2010), and the 'facial retroaction hypothesis' (Ekman, 2003) used in mirroring, the caregiver presents the infant's changing emotion back to her through a facial mirroring that covaries with the infant's emotional expression (itself in direct correspondence with her inner emotional changes) (Gergely & Watson, 1996). The caregiver surrenders to having a part of his emotional experience, that of the infant's emotion that he is sharing with her, be transformed by the inner changes occurring in the infant caused by her detection mechanisms. The mirroring caregiver resonates with the infant's inner changes, thus forming the covariating feedback connection between them, while they each have their own self-referential experience in the background during the connection (Pellerin & Lecours, 2012). Detecting the contingent variation between her inner experience and the parental display (Gergely & Watson, 1996), infant mechanisms alter in turn each inner cue present in the infant since the appearance of

the mirroring until it detects the corresponding changes in the parental display (Gergely & Watson, 1996). The detection of these corresponding changes was named *covariance* detection, and is part of the covariance-invariance principle at the heart of the revised model (Pellerin & Lecours, 2012).

The revision revealed that the mere detection of contingency between an infant's emotional expression and a parental mirror is not sufficient to promote successful social biofeedback processes: the parental mirror needs to change in tandem with the changes in the infant expression (which corresponds to the changes in the infant's inner experience) to enable the infant's contingency detection mechanism to circumscribe the set of inner cues accompanying the emotion that the infant will become sensitized to and that will form a sensation-representation of the inner event. A caregiver who would be emotionally 'contaminated' by the infant's emotional experience could have a face-to-face interaction with the child that could be detected by the infant's contingency detector as being contingent to her inner experience; but unless the changes in the mirroring *covary* with the changes in the infant's inner experience, the process cannot be successful. The covariance of the parental mirroring pegged to the changing emotional experience of the infant signals that a biofeedback teaching process is ongoing, thereby acting as a decoupling signal between the parental mirroring and the parent (Pellerin & Lecours, 2012). Covariance is accompanied by invariance: part of the parental emotional experience while mirroring the infant's emotion is about the parent's feelings while in the interaction and remains independent of the infant's emotional experience (invariant) during the interaction (a background emotion of calm, enthusiasm, irritation, or discouragement, for example,

revealed by the prosody of speech, muscle tone, posture, and other physiological cues [Damasio, 1999]). It makes known to the child that while certain parts of the parental display are about the child, certain parts are about the parent, decoupling the parent from the parental mirror by contrasting them for the infant. The parental emotional invariance from the mirroring is important for another reason: if the parent remains emotionally stable when faced with his infant's emotional experience, he 'contains' it, offering soothing and security to the child by implicitly signifying that the dyad is okay even if the infant is in the middle of an emotional storm. The parent's invariance also protects and supports the infant's independence from the parent, as it supports the infant's own invariance. Because they are both necessary and occur simultaneously, they are referred to as the covariance-invariance principle (Pellerin & Lecours, 2012). The infant's detector can contingently control the parental mirror when the somatosensations of an emotion experienced by the infant are circumscribed through maximizing (reducing or expanding the set of inner cues potentially accompanying an emotion until the full set is found) (Gergely & Watson, 1996, 1999). When all the inner cues have been found, any changes made to this set of cues effectively controls the parental mirroring, forming a biofeedback 'loop' signaling that the sensation has been isolated. The infant becomes sensitive to these somatosensations and the global sensation arising when they are aggregated, from which a representation is built (Gergely & Watson, 1996). Enabling sensitivity of the inner body and anchoring the representation of the emotion sensation in the child fosters self-detection (Fonagy et al., 2002), and possibly self-representations (Pellerin & Lecours, 2012). A verbal label of the emotion offered by the caregiver during social biofeedback interactions will be used to

form a symbolic representation attached to the implicit representation (Fonagy, Gergely, Target & Jurist, 2002; Steele, Steele, Croft & Fonagy, 1999).

The social biofeedback model has exciting implications for the therapy of adults. If therapists could provide covariant-invariant affective mirroring interactions to patients, they could sustain developmental processes potentially active over the lifespan of an individual, and help resume or repair emotional processes gone awry in early life. By sharing in, mirroring, and resonating with his infant's emotional experiences, a caregiver can help her develop an inner sensitivity so that her somatosensations become meaningful for her understanding of her inner and outer world: "consciously felt emotions can be conceived as signals that inform the level of deliberative processes about the automatic affective state changes of the organism" (Gergely & Watson, 1996, p. 1190). This process, when offered to all of the infant's emotional expressions (as opposed to being offered only for those emotions felt to be 'acceptable' to the caregiver in regards to his past traumas, psychological health, attachment style, family or group culture) promotes the ability to be informed by emotions and fosters the communication to self and others about inner states, the development of the self (Damasio, 1999, 2010), and the development of agency through the infant's experiencing of control of the biofeedback loop of interaction over the caregiver's mirroring and her own emotional experience (Fonagy et al., 2002; Gergely & Watson, 1996). The streamlined social biofeedback model's processes are implicit in many models of change. As an example, Gergely and Watson relate how Winnicott's model of the mother's holding function (1965) and Kohut's model of the maternal mirroring function (1971, 1977) both emphasize the importance of the infant's early experience of

omnipotence for healthy self-development, which is fostered by maternal attunement to and mirroring of the infant's inner emotional events:

> This clinical insight may be related to the workings of the contingency-detection mechanism proposed in our social biofeedback model. In this view, the sense of infantile omnipotence may be interpreted as corresponding to the sense of causal efficacy and control that is generated by the contingency-detection mechanism during adaptive mirroring interactions. (Gergely & Watson, p. 1201)

Malatesta and Haviland (1985) also suggest, based on their extensive research in the area of mother-infant interactions, that maternal mirrored-expressions of emotion may help infants begin to differentiate between categorical feeling states by enabling the infant both to view and feel the emotion at the same time, leading to an association between expression and internal experience.

Another model of change that postulates the intervention of implicit interpersonal processes is the one expounded by Daniel Stern and his colleagues of the Boston Change Process Study Group (1998, 2002, 2005, 2007, 2008). They propose a model of interaction that maps the process of change as manifesting on the implicit procedural level of interaction: the 'something more' than the explicit level of interpretations (BCPSG, 1998). They suggest that change in therapeutic endeavors entails an emotionally charged moment, called a ‘hot’ moment, as a potential gateway to a 'moment of meeting'. This special moment is understood as comprising a ‘resonating matching of specificities’ between dyadic partners resulting in a change in the patient manifesting in the here-and-now, what they call a reorganization of the 'implicit relational knowing' (Stern & BCPSG, 2006;

BCPSG, 2007). Although the model expounded by the BCPSG seems to describe a process of change that might be supported by mechanisms similar to those of the SBF model, given that they both require an emotional event as a trigger and a ‘resonating matching of specificities’ for the process of change to manifest, there are important differences between the two models. The Boston Group’s model will be used to contrast the SBF and shed light on its specific processes and potentialities to be of use in the therapy of adults. These mechanisms and processes will be illustrated further on, after a more in-depth look into the change process as expounded by the BCPSG, which is used to analyze the clinical vignette that follows.

The Boston Change Process Study Group and the Change Process

The BCPSG describes the process of change manifesting in the relational field between a therapist and a patient. They describe change fostering movements as well as the commonplace ones from which they arise. They believe that in therapy, as in caregiver-infant interactions, the partners continually seek to define the intersubjective environment through adjusting and improving the 'fittedness' of their interactions. They call this micro-interactive. here-and-now process 'moving along', “to capture the ongoing ordinariness” (BCPSG, 1998, p. 907) of this trial-by-error process of moving in the general directions of dyadic goals. Some goals are clear, as when administering a questionnaire, and the dyad can move along briskly. Sometimes an unclear goal must be made intelligible in the moving-along process. The moving along would be oriented towards two simultaneous goals: the first is towards a physical/physiological fit between the partners such as the positioning of bodies in the sitting process at the start of a session during face-to-face

psychotherapy, the second parallel goal “is the experience of a mutual recognition of each other's motives, desires, and implicit aims that direct actions, and the feelings that accompany this process” (Tronick et al., 1979, in BCPSG, 1998, p. 908). According to them, Stern's affect attunement (1985) process provides an example of the second goal.

In the course of moving along, the ordinary moments are called ‘present moments’. A present moment can become emotional or “affectively 'hot' and full of portent for the therapeutic process”, a special pathway to change called a ‘now moment’ (BCPSG, 1998, p. 909): “Clinically and subjectively, the way the therapist and patient know that they have entered a 'now moment' and that it is distinct from the usual present moments, is that these moments are unfamiliar, unexpected in their exact form and timing, unsettling or weird” (p. 912). For the Boston Group, 'now moments’ can be described as evolving subjectively in three phases:

> There is a 'pregnancy phase' that is filled with the feeling of imminence. There is the 'weird phase' when it is realized that one has entered an unknown and unexpected intersubjective space. And there is the 'decision phase' when the now moment is to be seized or not. If it is seized, it will lead to a 'moment of meeting', if all goes well, or to a failed now moment if it does not. (BCPSG, 1998, p. 912)

When seized by being responded to with an “authentic, specific, personal response from each partner, the ‘now moment’ becomes a 'moment of meeting'” (BCPSG, 1998, p. 909). Such moments are jointly constructed, requiring the provision of something unique from each party, hinge on a *'specificity of recognition'* between the partners where each has

captured an essential feature of the other's goal-oriented motive structure, and "the actions that make up the 'moment of meeting' cannot be routine, habitual or technical; they must be *novel and fashioned to meet the singularity of the moment"* (BCPSG, 1998, p. 913, emphasis added). According to them, it is when there is "***Matched specificities between two systems in resonance, attuned to each other***" (Sanders, 1997, in BCPSG, 1998, p. 914, emphasis added) that the 'moment of meeting' occurs, which is *precisely what fosters change* according to the Boston Group. When such a 'moment of meeting' takes place during mutual regulation:

> an equilibrium occurs that allows for a 'disjoin' between the interactants and a *détente* in the dyadic agenda (Nahum, 1994). Sander (1983) has called this disjoin an 'open space' in which the infant can be alone, briefly, in the presence of the other, as they share the new context (Winnicott, 1957). (BCPSG, 1998, p. 909, emphasis added)

Mutual regulation is then momentarily suspended, and the patient is "freed from the imperative of regulation to restore equilibrium" so that creativity becomes possible (BCPSG, 1998, p. 909). When the change is accomplished, the dyad reinitiates the process of moving along from an altered 'implicit relational knowing'. In short, the therapeutic participants are aiming towards fittedness of their dyadic goals until an emotion surges in the patient, or the dyad. When this emotional event is met by each participant's specific response resonating with that of the other, change is made possible.

This certainly describes social biofeedback processes to the extent that they might be considered to be participating processes in the Boston Group's model of change. The

main difference between the two models is that the SBF seems to illustrate processes occurring at a more microscopic level, **antecedent to those described by the Boston Group**. The SBF, through mirroring interactions, fosters self-detection through implicit intrapsychic mechanisms (ways of being with self), while the Boston Group focuses on changes in more interpersonal structures (ways of being with others). SBF processes, through the sensitization and representation of emotions, produce the procedural mechanisms necessary for self-detection (attention to one's emotion as it is activated, identification of the emotion category, etc.), which is what we mean by "ways of being with self". The results of this intrapersonal processing will be communicated in the interpersonal exchanges described by the Boston Group. This is not to say that the BCPSG does not have an effect on intrapersonal procedures. However, the intrapersonal procedures produced by moments of meeting are described as relational (although internal) in nature. Similarities and differences between the BCPSG and the SBF model will be illustrated by a clinical vignette originally interpreted using the BCPSG model by the relational psychologist Holly Levenkron (2009). The vignette will be presented with this interpretation before it is interpreted with the SBF model. Links between their model and the SBF model will then be made. This vignette was chosen partly because it is interpreted with the BCPSG's model, which makes it easier to contrast the two models, but mostly because it shows how Levenkron helped her client achieve momentous change in their first meeting together, which could potentially originate in her inadvertently accomplishing mirroring behaviors of the kind required for social biofeedback processes to be successful.

Case Vignette

A depressed 48-year-old woman was referred to Levenkron (2009) who called her 'Joanna'. In the course of the consultation, the patient informed the therapist that she had seen two other professionals in order to find a new therapist for herself. The patient was open and excited with the other two 'seasoned' therapists she had already consulted, but she wanted to meet with a woman who was younger than the men, and Levenkron was reported to work 'differently'. The therapist and patient covered a lot of ground and got to the client's deeply painful reason for returning to treatment: “She felt passive and humiliated when failing to find the ability to speak out” (p. 185). She suffered abuse in her marriage and wanted to work on leaving her husband. The therapist found the patient “bright and verbal”, “relaxed in the face of painful self revelations”, and “ready to work on her issues” (p. 186). Levenkron felt that the interaction was going smoothly. She also noticed an “aura of embarrassment mixed with friendliness, both expressed by her almost constant smiling during the session” (p. 186). The therapist does not know how often she smiled back, but the effect of the patient's smile was not unpleasant although she felt some pressure to stay 'entrained' with her. Levenkron allowed the session to go a little after the allotted time. She had been enjoying the conversation. But because of the patient's references and reverence for the 'senior' male therapists, the therapist felt “a background feeling of self-consciousness” (p. 186) about whether or not she would be the one chosen by the patient. She prolonged the session by asking if the patient had any questions. When the patient answered in the negative, the therapist asked further:

> Do you have any thoughts about our time together? She was silent. After a palpable series of seconds, she began to smile even more broadly. Her smile

> made me feel good. It relieved my tension although I could not read its meaning. I was also confused given that a decision was due. If she didn't know what she wanted to do, she could say so. Maybe she was pulling it all together. She stretched her arms over her head slowly as if to begin a yawn and extended her long legs in front of her, towards me. With a still more noticeable smile she slowly said, 'Well, you know, I think I want to work with the first therapist I saw last week'. (Levenkron, 2009, p. 186)

The therapist was surprised and upset by the patient's answer: “My smile had been in concert with her broad smile, and now I felt embarrassed” (p. 186). The session was over and the therapist said in a warm voice that they had to stop. After standing up she took a step towards the patient and said earnestly: “You know, you really should do what you think is best for you!” (p. 187). The therapist then reports:

> She again caught me off guard when she responded in an excited pitch, her eyes darting, 'I never do that! This is the second time I can remember doing such a thing!' I found myself spontaneously saying in an emphatic but quizzical voice, 'You never do what?' I was feeling mildly irritated, but also steady with a new-found familiarity. She seemed to take my question well. Indeed, we both seemed energized. Our faces were lighting up. I guess this freed her to say, assertively and with joy, 'I never say what I want!' (Levenkron, 2009, p. 187)

The therapist was silent following that response from the patient. The therapist did not want to end the session and felt that the patient didn't want the session to end either. Levenkron reports feeling 'captivated' by how charged the moment was between them, and that it

needed to be seized: “I had a hunch this was an important moment. Something was signaling me and it was coming from the implicit domain: I faced a moment of decision, of *kairos*. I did what I felt to be the human thing. I trusted it and went with it” (p. 187). Levenkron gestured as if to hold out her hand and said “You did a lot of good work in the short period we were together” (p. 187). Saying this she felt as though the patient already was hers. It was a positive feeling. She then said, “You look like you are ready to tackle your passivity” (p. 187). Joanna answered, “I know it had something to do with what happened in the consultation, but I don't want it to seem like I am flattering you” (p. 187). The therapist answered “I believe something did happen, and that I saw it happening” (p. 187). The patient answered with a relaxed smile. The therapist added, “If your choice of analyst doesn't work out, then you can come back”. They shook hands and the patient left. About a week later, Joanna “left a message saying something had happened in our consultation that stunned her” and decided to come back because she felt she had really been able to be herself with the therapist.

In the section called 'A Moment of Meeting', Levenkron interprets the vignette according to the BCPSG model. According to their perspective, the 'local' level of interaction during the course of the hour of consultation was a series of 'present moment'. In each present moment, there would be enough time to grasp what is going on in the here-and-now between the two participants, although not necessarily explicitly or symbolically. Through the accumulation of present moments, each partner would come to “a better procedural knowing of how to interact with the other” (Levenkron, 2009, p. 188). It forms the 'moving along' process the therapist felt they were doing for most of the session. It

made her feel like she would be comfortable with Joanna and would enjoy working with her: “a fruit of my implicit relational knowing” (p. 188). Levenkron felt that her patient's implicit relational knowing led her to feel that the therapist was someone she could be comfortable telling her what she wanted—even the fact that she wanted to work with someone else. When a present moment becomes affectively 'hot' it can become a 'now moment' that, if seized, can give rise to a 'moment of meeting'. The therapist reports two potential 'now moments' in the interaction with Joanna. The first occurred about midway when the patient told the therapist the name of one of the two male therapists she had previously met. He was supposedly famous, and he was the one she was thinking of working with. She said so with a 'drum roll' in her voice and a “flashing look in her eyes” (p. 188). But Levenkron being geographically new to the area had not a clue about who that man was. As a consequence there was a 'flat' moment in the local level of interaction where neither of them knew how to pick up the thread. As a 'now moment' it had potentially failed. The therapist felt that the ball had been dropped, but that the 'now moment' maybe was 'enduring' and could be resolved later. The second 'now moment' came for Levenkron at the end of the session when she asked Joanna for a decision regarding who she would like to work with in the future, just before Joanna was to announce that she would be working with the other analyst. Here, she readily vouches for the subdivision of phases provided for a 'now moment' by the Boston Group (BCPSG, 1998):

> There was indeed a 'pregnancy phase' filled with a feeling of immanence as Joanna stretched her arms and legs. Likewise there was a 'weird phase'—'weird' being as good a word as any I have for what I felt—as she smiled at me while she maintained

> the stretching posture. All this was accompanied by a mood that hung over us as if we were brought into an unknown intersubjective space. This mood, in turn, was followed by a 'decision phase' in which I truly felt momentarily at a loss as to how to respond to her announcement, although I knew that some response was called for. (Levenkron, 2009, p. 189)

At the end of the session, Levenkron reports a 'moment of meeting' and a change in the implicit relational knowing, when she and Joanna were both celebrating and elaborating on Joanna's affirmation of what she wanted for herself. They were not celebrating the 'content' of her announcement, that she would work with another therapist, but celebrating what had transpired between them: “I had supported the freedom she achieved in telling me what she wanted” (p. 190). The ‘moment of meeting’ promoted a change in their implicit relational knowing. According to Levenkron, the BCPSG would see that last phase as an example of intentional fittedness, shared affective regulation and mutual recognition: “They might say that both of us had been looking to find a way to relate to each other while internally negotiating our moves, utilizing what we were picking up from each other. For the Boston Group, the achievement of this greater fittedness is the hallmark of therapeutic success” (p. 190).

Levenkron has reservations about this interpretative perspective. She notes that achieving such fittedness does “nothing to distinguish one kind of treatment from another. Nor is there any warranty that the search for it automatically yields the achievement of it” (p. 190). Furthermore, Levenkron feels that in the first phase of the last sequence with Joanna, which she names ‘the rejection’, when Joanna chooses the other therapist, that

'mutual connectedness and recognition were not yet possible' (p. 190). The 'moment of meeting', considered by the BCPSG as being integral to the 'something more than interpretation' that leads to change, came for her, paradoxically, as they were agreeing to disengage, in what she calls a moment of dysregulation. Levenkron follows this interpretation with one based on her preferred relational approach. The same comparison work between her relational model and the SBF could be done successfully, in our view. Regretfully, lack of space prohibits the inclusion of her relational interpretation, or a comparative analysis, in this study.

The Case Vignette Interpreted with the SBF Model

At first glance, it appears that Joanna needs to participate in a permissive relationship to give herself the right to affirm herself. In such a perspective, it would seem that the interaction between patient and therapist is a successful test, whereby Joanna affirms herself even though she will disappoint the other. Levenkron supports her client's need by accepting this and treating her with openness and warmth, even though her client's desire to work with someone else is quite upsetting to her. This would seem to be what has fostered change in Joanna, which Levenkron explains by saying that she had 'supported the freedom she achieved in telling me what she wanted', transforming a 'now moment' into a change fostering 'moment of meeting' as they agreed to disengage. But taking a closer look at the exchange, we notice that 'supporting the freedom' that arises when Joanna voices her preference for the senior therapist cannot explain her sudden capacity to do so. Since Joanna complains of lifelong difficulties of self-affirmation, it is possible to take the perspective that Joanna has already accomplished part of the change she is seeking in

therapy, when she affirms herself for only the second time in her life that she can remember doing such a thing. It would follow that the change-fostering interactions with the therapist must be contained within their exchange *prior to* the moment she affirms her choice. What transpired between them to foster that change?

Let's start then, by interpreting with the SBF the first part of the vignette, concentrating on what happens in the dyad up to Joanna's affirmation. The therapist's *sensing, sharing and mirroring* of the patient's emotional inner state and, possibly, her *allowing the mirroring to be controlled* by the patient's detection mechanisms as demonstrated by the therapist's facial mirroring covariating with the patient's facial expression, will be illustrated, along with the social biofeedback processes of *sensitization* of the patient to difficult-to-apprehend inner signals, and *representation formation* built of the sensitized sensations indicative of the patient's experienced emotion. The social biofeedback function of *self-detection* supporting the patient's self perspective and affirmation will be highlighted, as well as a verbal labeling of the sensitized emotional experience offered by the therapist, which can be used for symbolization.

At the beginning of the session, the therapist and client are finding a mutual direction and goal during the interaction by intersubjectively negotiating the best fit between one another's intentions. For the SBF this corresponds to the 'pedagogical stance', where both partners are face-to-face and one signals to the other through her receptivity, attention, and availability that she is present to help the other with her psychological learning needs (Csibra & Gergely, 2006). This triggers in the recipient her own detection mechanisms to use the therapist as an external feedback pathway and help her find out

which parts of the therapist's behavior are 'about' her (Gergely & Watson, 1996). Therapeutic interactions at the local level can be understood as an attempt to resume interrupted, damaged or absent developmental processes necessarily requiring a partner for accomplishment.

Once in a face-to-face interaction, social biofeedback processes start when the patient expresses an emotion, triggering mirroring behaviors in the therapist. From the start of the consultation, Levenkron describes Joanna as seemingly ‘relaxed’, even in the face of painful self-revelation. Joanna is undertaking her third consultation in two weeks, which could cause habituation to the experience, maybe allowing her to be relaxed even as she reveals her suffering. Being relaxed is considered the background emotion, while the suffering would be in the foreground of the patient’s emotional experience. The therapist’s ability to feel at once both the client’s background emotion of relaxation, even as it recedes in the face of a painful foreground emotion (such as anger or sadness, for example), is an important ability for the helping social biofeedback partner. Sensing the patient’s foreground emotion enables the sharing essential to mirroring processes, while sensing background emotions helps to refine the understanding of the other—just as sensing her own background emotion helps the therapist remain self-referentially grounded in the interaction. Levenkron feels an ‘aura of embarrassment mixed with friendliness’ coming from Joanna, as evidenced by her smiling a lot during the session. The feeling of embarrassment that Levenkron is sensing in her patient seems more diffuse than the friendliness, since she qualifies it as an ‘aura’. Her embarrassment might have to do with Joanna’s knowledge that she is trying Levenkron on for size as a potential therapist.

Friendliness, on the other hand, is an emotion signaling benevolence towards the other. It could also be construed as a more complex expression of the basic 'universal' emotion of joy. Ekman (2003) finds that the problem with joy, enjoyment or happiness is that these terms are not specific enough. Because psychology has researched psychological difficulties more than psychological health, the negative emotions are better known and studied than the positive ones. Ekman (2003) "believes that there are more than a dozen enjoyable emotions, each universal, each as different from the other as sadness, anger, fear, disgust, and contempt are from one another" (p. 190). The difficulty with the positive emotions (sensory pleasure, an emotion brought on by one of the senses, such as touch for example; amusement; contentment; excitement; relief; wonder; ecstasy or bliss; gratitude; and a few more for which there is no English words yet, such as *fiero*, a kind of pride one takes in an accomplishment that is not expressed for others but for oneself) is that they are all expressed with a smile (Ekman, 2003, Sauter, 2010), but may be differentiated by the kind of vocalization that accompanies it (Ekman, 2003; Sauter, Eisner, Ekman, & Scott, 2009) and by other cues such as touch or postural information (Sauter, 2010). The research on these positive emotions is still progressing. But whether it be friendliness or another enjoyable emotion, what matters is that the emotion felt by the therapist be somewhat congruent with the patient's facial display during mirroring interactions: if Levenkron sensed sadness while Joanna facially expressed a smile, it would be impossible for her to mirror the inner changes of the patient since they would be defensively masked by the smile. Friendliness or joy are emotions both congruent with a smiling facial display, and therefore can be mirrored. The therapist's first process in the social biofeedback interaction, the *sensing the inner state, or states,* of the patient is evidenced here. Biofeedback

procedures depend on the accuracy of the sensing apparatus measuring the inner state of the subject. Social biofeedback processes likewise depend on the therapist's ability to sense her patient's inner state to help her get sensitized to it (Gergely & Watson, 1996). Of course, we don't know exactly what Joanna's inner state is at the time. It could be that her smiling is a front to mask her embarrassment, an expression of politeness, or it could be a genuine expression of excitement to consider Levenkron as a potential future therapist. What seems more important is that smiling is at the forefront of the emotional expression between both dyadic partners in the session, and that the smile expressed by Joanna seems to start from a benign one and become slowly bigger and bigger, until it becomes an elated expression of 'joy' towards the end of the session. This might imply that she is expressing more than one positive emotion during the session. Joanna's smile, in fact, could express many different emotions: it could be relief at being finally allowed to explore her inner world in the presence of a supportive other. Or it could be gratitude to be in the presence of someone that tolerates her subjectivity. Her smiling could denote joy at encountering a selfobject willing to meet her selfobject needs. Or it could be excitement to find someone who finally mirrors her facial expressions, allowing her to explore and also express the pleasurable inner somatosensations sensitized in the interaction, since enjoyable emotions (just like unpleasant ones) activate touch receptors in the viscera. It is unfortunate that Levenkron did not indicate whether she mirrored the painful emotions Joanna revealed to her at the very beginning of the session. But when Joanna smiles, Levenkron is very clear that they share the same facial expression. The possibility that Joanna is smiling politely can be only entertained for the very beginning of the smiling exchanges with Levenkron. A polite smile engages only a few of the muscles used for smiling (mostly the mouth and

cheeks) and cannot become wider and wider, a smile of joy, without engaging certain eye muscles that transform it into a genuine smile (a Duchenne smile: Ekman, 2003). Levenkron's positive feelings experienced when smiling back at Joanna (without knowing the meaning of Joanna's smile) can also help dismiss the possibility that the smile is only polite, since it would have no resonating effect on Levenkron's inner state. We hypothesize that Joanna's almost constant smiling is not entirely defensive since she is 'relaxed', but is evidence of her excited, pleasurable joy at finding a partner who mirrors her, allowing her to center herself on her inner processes. Levenkron says she doesn't know how often she smiled back to Joanna, but that she did feel some pressure about staying 'entrained' with her. In other words, we can infer that Levenkron felt a pressure to respond to Joanna's facial expression in kind. Interestingly, the feeling of pressure to stay 'entrained' experienced by Levenkron can be attributed to the patient's detection mechanisms using the therapist's mirroring for sensitizing purposes. This biofeedback process might make Levenkron feel like she has to smile again and again in a repetitive manner, even as Joanna's smiling expression changes slightly over time.

Since Joanna is 'bright and verbal', one wonders why it would be necessary for her to become sensitive to positive emotions. To have difficulties with positive emotions might seem counter-intuitive to the elaborative work often accomplished in the clinical setting centered on painful 'negative' emotions such as anger, sadness, or pain. But if we consider positive and negative emotions as motivating approach or distancing behaviors, it is possible to conceive that a patient like Joanna might have been unmet in her need for mirroring of positive emotions as she was seeking stimulus if, for example, those needs

came into conflict with her caregiver's need to keep her emotionally dependant and close by at all times. Alternatively, Joanna's caregiver might have suffered from a psychological disorder precluding her ability to participate in mirroring behaviors with her as an infant. Cicchetti and White (1988) report that "Depressed mothers may engage less frequently in imitation, or they may have a tendency to imitate negative facial expressions more readily than positive ones" (p. 190). The adult child of a depressed caregiver might thus be unsensitized to positive emotions such as excitement, contentment and pleasure. These aroused emotions could be undifferentiated from other emotional inner sensations or other inner cues (such as proprioceptive cues, for example). Or it might be that Joanna has had her positive emotions properly mirrored and represented as an infant, but that subsequent difficulty with her caregiver (such as the onset of depression, for example) might have caused her to have the sensations of emotions disconnected through defenses from their representations in order to promote the survival of the child in these new parental circumstances. There could be many instances of caregivers having difficulties expressing (and therefore mirroring) positive emotions, because of mental-health issues, cultural values, or socio-economic constraints. Since positive emotions sustain positive self-regard, self-esteem and the experience of well being, as well as motivating exploration, separation, autonomy and the development of new relationships, it could be that they remained undifferentiated or became disconnected and therefore uninformative to Joanna for lack of proper mirroring behaviors by needy or troubled caregivers. It could also be that the caregiver never had that emotion mirrored back to *him* as a child by *his* caregivers, thus precluding his own ability to eventually mirror the emotion to his infant. It is known that certain parents cannot receive certain emotions from their child because of their attachment

histories, family or group culture, and/or traumas (Main, 1994, Gottmann & De Clair, 2001). If defenses arose to protect Joanna from a lack of mirroring or a need to disconnect from the emotional experience, we hypothesize that finally meeting a responsive mirroring partner would accomplish the sensitizing, representing, and symbolizing of the emotion, as well as dismissing the now-obsolete defenses and giving Joanna the opportunity to have emotions be about her, to be used for meeting her own needs. Alternatively, difficulties of affirmation could stem from defenses that arose because of conflicts or traumas. But such a defense would have required an interpretation or another technique to be resolved as swiftly as it was done in this session. There is no evidence of such an intervention in the vignette.

Of course, this analysis is entirely speculative, since we have never met Joanna, and only have a second-hand report of her session with Levenkron. The SBF does not explain all of the change potentially arising in a patient. Its main contribution resides in the sensitization of emotions and self-detection. Other therapeutic processes can intervene, such as those expounded by the BCPSG, to explain such change. This initial auto-detection process does not stop here, but keeps unfolding in loops of social biofeedback in order to affirm, confirm and complete the auto-detection. The contingency detector keeps working for as long as an emotion expressed by the patient is met by a mirroring interaction, potentially until the sensitized and represented emotion has been symbolized.

The last moments before Joanna's affirmation illustrate the principles of covariance and invariance of the mirroring so minutely that they merit being analyzed, even if they represent a secondary phase in Joanna's auto-detection process in the consultation. When Levenkron asks her "Do you have any thoughts about our time together?" (p. 186), Joanna

is silent. She is experiencing an *emotional inner state* (does she feel excited to work with this particular therapist? Does she prefer another? What does she want?), which triggers another loop of mirroring between the partners. After a palpable series of seconds, Joanna begins to smile even more broadly. Levenkron says that the patient's smile makes her feel good and relieves her tension, although she can't read its meaning. This is evidence that the shared feeling in the dyad *originates in the patient* and is felt by the therapist through sensing and mirroring, since there is no explicit meaning or reason for its existence that is apparent to the therapist. Levenkron feeling good as she receives the patient's smile can be evidence of her *empathy*, her ability to allow her foreground inner state to be transformed by the inner state of another, while her tension, relieved by Joanna's smile, corresponds to her background emotion and her invariance. The SBF mechanism of *invariance* promotes the autonomy of the partners in the biofeedback interaction. Levenkron sensing her own 'background feeling of self-consciousness', as she wonders whether Joanna will choose her to pursue therapy, also corresponds to the sensing of her own invariance in the social biofeedback process. This background feeling helps her retain her self-perspective from the patient's foreground emotion that she is mirroring, and therefore experiencing. It also helps Joanna's detection mechanisms contrast the foreground emotion being shared and mirrored with a background emotion that does not change in tandem with the mirroring or with Joanna's inner sensations, therefore offering not only a contrast against which it can be more easily perceived, but also fostering autonomy between the interactants, even as there is a biofeedback connection that joins them. As Joanna smiles broadly, Levenkron reports that her own smile was "in concert with her broad smile", again reporting evidence of the ***covariant*** *mirroring of the patient's inner*

state as demonstrated by their matching facial displays and the 'concerted' co-variance between them (p. 186). Joanna stretches her arms over her head slowly as if to begin a yawn and extends her long legs in front of her, as if time is suspended. Levenkron reports feeling 'weird' as Joanna smiles at her and maintains the stretching posture, *while she waits and smiles back* (again evidence of mirroring interactions). Another therapist might have felt the need to say something at that weird, awkward moment, to interpret it (even if only silently) or to become serious, awaiting the decision. But Levenkron made (perhaps implicitly) the decision to wait and continue mirroring Joanna's facial expression, thus allowing Joanna's contingency detector to circumscribe the full set of somatosensations accompanying the emotion she was experiencing and enable the global feeling of the emotion to become sensitive and represented. The sensitized feeling becomes the content of an implicit representation that will be anchored in Joanna, in the part of her that is not covariating with the mirroring therapist—her invariant part—promoting self-detection. Anchoring the representation completes the social biofeedback loop of interaction, allows Joanna to feel her sensitive inner state, and *fosters autonomy through the temporary ability* ***to be with a part of herself*** *that is not connected with* Levenkron, *at the same time as* ***she is sensitive*** *to the part of herself* supported by Levenkron and the social biofeedback connection between them. This process experientially **integrates** her as a more wholly detectable self, helping her affirm herself. This concludes the first part of the vignette analysis.

The second part of the vignette concentrates mostly on the part of the change process relevant to the BCPSG's perspective on how change also occurs through the

fittedness achieved between partners, by using ‘implicit relational knowing’ during problematic interactions such as the one that arises when Joanna makes her choice. However, the SBF cycle is not yet completed. Mirroring behaviors are still evidenced in the rest of the exchange between Levenkron and Joanna, culminating with the production by Levenkron of a verbal label that can be used to symbolize the sensitized emotion: “You know, you really should do what you think is best for you!” (p. 187). And even beyond, when Joanna is surprised to have affirmed herself for only the second time in her life— ‘I never do that!’ —Levenkron again reports mirroring behaviors when both their ‘faces were alight’, (p. 187). While it is not necessary to analyze them all, two particular moments of the second half of the session cannot be ignored. Immediately following the weird moment suspended in time, when Levenkron is waiting and smiling, Joanna, *with a still more noticeable smile,* affirms herself by slowly saying 'Well, you know, I think I want to work with the first therapist I saw last week' (Levenkron, 2009, p. 186). For Joanna, her even bigger smile might be an expression of pleasurable joy arising out of the self-detection and self-knowing promoted by the meeting of a mirroring need by a social biofeedback object: for Kohut, the meeting of a selfobject need gives rise to joy (Oppenheimer & Denis, 1998). Joy might also arise when a mirroring therapist meets a patient’s need for an external biofeedback pathway sensitively. But Levenkron reports feeling surprised, upset, a little numb and then embarrassed; after all, her “smile had been in concert with her broad smile” (p. 186), again evidence of mirroring pressures occurring for the therapist right up to Joanna’s affirmation. Following this come the rest of the BCPSG’s processes required to foster change, such as the 'decision phase' when Levenkron felt momentarily at a loss as to how to respond to Joanna’s announcement, although she knew that some response was

called for. Levenkron seizes the ‘now’ moment and transforms it in a change inducing ‘moment of meeting’ as the session is over and she makes a hand gesture towards Joanna, taking a step towards her and saying earnestly: “You know, you really should do what you think is best for you!” (p. 187). This is action not only relevant for the BCPSG’s perspective, but also for the SBF. This statement can be perceived as supportive, and it is. It can also be construed as a symbolic representation of the inner information raised to consciousness by sensitizing and the actions fostered by the social biofeedback interaction. It literally labels what Joanna has just accomplished: using her inner state to inform her about the best course of action for herself. Levenkron’s words ‘you know, you really should do what you think is best for you’ can be used to attach a symbolic component to the positive sensation-representation that was just sensitized.

Discussion

The present study aimed to: 1) illustrate aspects of the change process in adult psychotherapy according to the social biofeedback model and 2) delineate the specific contribution of the SBF model to the change process, by contrasting its impact to another model emphasizing mirroring interactions and implicit processes in the psychotherapy of adults (the BCPSG model). A case vignette interpreted with both models was chosen for achieving these goals. The SBF model in the clinical setting requires that the therapist mirrors the emotions expressed by the patient, using empathy and the monitoring of his somatosensations as being potentially informative of the emotional experience of the patient. His capacity to surrender to the nature of the object use entailed in being an external biofeedback pathway, a sensor-beamer, is also shown as being essential to the

sensitization function of the SBF. The skills inherent in the relational approach favored by Levenkron seem to generate the sensitivity, flexibility and surrender necessary on the part of the helping partner in the dyad to produce the mirroring behaviors (unconscious or not) required of the social biofeedback process of the sensitization of an emotion, and therefore will also be used to contribute to the discussion. These dimensions of the clinical implications of the model will be expounded on below.

The Boston Group's change process as described in Levenkron's vignette of 'Joanna' converges with SBF processes enough to hypothesize that the two models are compatible. But beyond the points where the two models converge, the SBF model seems to explain the process of change from the point of view of the patient more precisely, perhaps because of its *sensitization and representation building functions*, as well as its *self-detection function*. If for the BCPSG it is ultimately the "matched specificities between two systems in resonance, attuned to each other" that fosters change (Sanders, 1997, in BCPSG, 1998, p. 914), it is the same principle supporting the SBF, but *with a twist*: it is the resonating attunement to each other but *in relation to the patient's inner emotional experience* that fosters change. **The social biofeedback interaction is not about the relation but about the patient's inner world.** What changes as a result of successful social biofeedback processes is that the patient's inner world becomes more differentiated and intelligible: when having an emotion about a situation or an event, the patient can recognize the emotional experience and appropriate it to be used for reflecting, communicating or decision making. The SBF model **represents** (at least implicitly) unformulated emotional experiences. These experiences might have never been properly

mirrored, in which case the patient might be seriously impaired, with the sensations accompanying these experiences remaining inchoate, warded off, repressed or disavowed. For other patients, it is probable that the emotional experience has been mirrored enough in early life to become sensitive and represented, and that subsequent developmental difficulties or trauma disconnected the emotion representation from its bodily source. But whether needing an original sensitization or a reconnection to the inner world through re-sensitizing, if there is an aroused emotion in the patient occurring in a dyadic mirroring exchange, it can become sensitive and symbolized, and the appropriated sensation-representation can help give rise to a better sense of self.

Metaphorically, it might be useful to envision a game where the player is born only when she has cards to play with. No cards, no player yet. When the potential player, through a biofeedback interaction with another player or a machine, can isolate from her inner experience the sensation associated with a core principle of the game, a card would be generated (an implicit representation). When this card has been paired often enough with a verbal or machine-produced label, the card would become symbolized. It would carry symbols that represent the sensation, and which would also represent the meaning of the sensation to the newborn player: a word can now be used to make explicit the implicit. Thus the player is born and she can now use her cards to comprehend and express her inner world. For clinical models using words, symbolizations and meaning (the cards of our metaphor) to help their patients, it might be useful to accomplish social biofeedback interactions (with patients that have difficulty expressing or sharing emotions, for example) in order to create these cards by repairing those early representational capacities before

attempting more elaborate and complex interactions. Communicating with a patient using words representing emotions that haven't been properly sensitized could cause further affect dysregulation. First making sure the patient has what she needs to play the game could be crucial. And then making sure that she is playing with the right set of cards. Some emotions might possibly require an original sensitization and representation process, or a resensitization to reconnect the defended somatosensations to their representations. Both processes are accomplished by the same SBF mirroring interactions. In both cases, the patients would experience unsensitized emotions (which is not to say that they are not feeling emotional activation, but that the sensations are undifferentiated, or unapprehended), perhaps similar to Donnel Stern's 'unformulated experience' (1997). Whether patients have not yet been sensitized to some emotions, or have been sensitized and then were required to defend themselves from these experiences later on in their development, they all have been traumatized relationally. The capacity to trust another human being with sharing an unformulated emotion may well need to be reestablished before being able to engage in sensitization processes. The therapist might be required to mirror emotions that are already sensitized and are easily accessible to the patient, before the disavowed needs for mirroring unsensitized emotions surfaces. Social biofeedback processes, largely innate yet essential to the developmental maturation of emotion, offer the kind of interaction *solely directed at the inner feelings* of the patient that might help repair trust issues that have to do with being used for the caregiver's own psychological needs as well. Once this challenge has been met, the repair of developmentally crucial social biofeedback interactions could be productive for many adult patients.

The following speculative clinical formulation of Joanna's case, from the perspective of the SBF, will be used to further the discussion of the model. Joanna is meeting Levenkron to determine if she would prefer to work with her, or with one or another of two male therapists she met previously. This particular situation enable Joanna to pursue two simultaneous goals in the session: to reveal herself to the therapist as though she is already in therapy with her, and to evaluate Levenkron against the other potential therapists in order to choose one of them. Joanna does not seem to have difficulties with the expression of negative emotions, as she is relaxed while making painful self-revelations, according to Levenkron. But she might be implicitly seeking to have one or more positive emotions mirrored in a dyad, as evidenced by her sharing a smile with Levenkron for a large portion of the consultation. In a Kohutian self psychology perspective, she could be understood to have unmet selfobject Mirroring needs (Kohut and Wolf, 1978). These refer to a need to feel affirmed, accepted and appreciated, especially when showing oneself (Wolf, 1988). These Mirroring experiences (capitalized to differentiate them from SBF mirroring interactions), which foster the capacity to regulate self-esteem, to enjoy physical and mental activities, and to pursue goals and ambitions (Ornstein & Kay, 1990), could be construed as referring to the experiencing of the positive emotions arising when one expresses positive self-regard in front of a significant other. Joanna's difficulties of self-affirmation could be interpreted as revealing difficulties with positive emotions that would help reveal to her the path to self-satisfaction. Her feelings of depression might contribute to, or be the result of, those same difficulties with these emotions. In view of her high level of organization, and because of how swiftly she manages to affirm herself in only her first consultation with Levenkron, Joanna is hypothesized to have had her positive emotions

sensitized most probably as an infant, but maybe later having some of them disconnected from their symbol and defended against (to remain close to a depressive caregiver, for example), or disconnected in relation to a single dimension of expression, such as in relation to the self, for instance. It is possible that a sensitized emotion such as excitement be disconnected only in regard to a focus on the self. For example, it would be possible for a patient to be sensitive to the excitement provoked by encountering a new person or environment, while having the excitement provoked by an interaction focused on herself to be defensively disconnected from its bodily sensations. From the SBF perspective, Joanna is understood to have sensitized positive emotions that have been disconnected from their bodily source by difficulties or trauma arising during development, which impair her from appropriating the information inherent to one or more of these positive emotions such as pleasure, excitement or joy—emotions necessary to help her meet her needs in a satisfying manner. Her self-structure would be enfeebled by the missing self-detection afforded by the apprehension and appropriation of these positive emotional signals, and result in problems of self-esteem and self-affirmation.

Joanna's unformulated positive emotions for her self-processes must have been elaborated with the help of partially sensitive caregivers, or by sensitive caregivers experiencing personal difficulties in that regard, which would have been traumatic for Joanna. If Joanna's difficulty of affirmation was not provoked by mirroring difficulties with her caregivers but arose later in her development, it could be that excitement or pleasure were properly mirrored for her as an infant, for example, but later became defended against. If these emotions have been sensitized, represented and symbolized, they could still become

repressed by defenses later on in life. Defenses could explain Joanna's smiling demeanor, which could be considered an inappropriate affect used to contain stress or anxiety about meeting this therapist for the first time. Or it could be evidence of dissociation from her emotional experience linked to having to reveal parts of herself that are painful to access. It might also be evidence of behaviors linked to her difficulties of self-affirmation, such as pretending to be a good girl with 'mother' while secretly having already chosen 'daddy', the senior therapist. But if that were the case, the change process deployed before Joanna's choice would have contained an interpretation of a conflict or defense, or the use of other techniques to foster such a change in Joanna. Yet Levenkron reports her transformative actions as starting with the utterance "You know, you should do what you think is right for you!" which, in our perspective, is the last part of the social biofeedback change process per se. In fact, Levenkron identifies the moment of decision about seizing the 'now' moment to transform it into a 'moment of meeting', as happening at the very end of the session, when she says "You did a lot of good work in the short period we spent together. You look like you are ready to tackle your passivity" (p. 187). Joanna herself seems to identify the change as happening earlier in the session when she answers: "I know it had something to do with what happened in the consultation" (p. 187). We can venture that Joanna's smile is not the same smile throughout the consultation: what is at first a smile of embarrassment mixed with friendliness changes along the way, becoming wider, brighter and eventually almost triumphant. By the end of the social biofeedback loop, her face is 'lighting up' with *joy* even, speaking "assertively and with joy" (p.187). For Kohut, the satisfaction arising from the successful meeting between a patient and a self-object is joy, while in the object-relation and drive-based relation the

satisfaction is pleasure (Oppenheimer & Denis, 1998). Joy of an intense kind may be arising in Joanna because, akin to a selfobject need successfully met, she has had *mirroring object needs* that have been met sensitively.

Of course, being a mirroring object for a patient is not necessarily relationally satisfying. There is obviously discordance between what is going on for Levenkron in the session, and what seems to be happening for Joanna. Prior to the moment when Joanna caught her by surprise, choosing the other analyst, she felt: "a feeling of immanence as Joanna stretched out her arms and legs"; 'weird', "being as good a word as any for what I felt—as she smiled at me while she maintained the stretching posture" (p. 189). Levenkron explains how she had been smiling 'in concert' with Joanna's big smile as it got bigger and bigger, until she announced her choice. This left her feeling embarrassed. Levenkron's discordance arises from the fact that she has no idea what is happening at that moment for Joanna: "Had I been pulled along by her smile? Was it genuine? Was she sadistic?" (p. 186). While the mirroring of her smile was used by Joanna's contingency detector to form a biofeedback 'loop' connecting them, helping her choose her therapist, for Levenkron it was a moment of "rejection" where Joanna was expressing "her wish to leave" "resulting in a dysregulated complementary position of winner and loser" (p. 190). Explicitly it might be that Joanna rejects Levenkron in order to exist (maybe reenacting an 'original' rejection), generating a discordance of experiences between them. But implicitly, through the mirroring produced during the now moment, there is concordance of content: as Levenkron feels 'weird', we would contend that she is experiencing the unformulated contents of Joanna's experience. As she smiles more and more enthusiastically, Joanna is not yet

grasping for herself what her expression reveals, and neither is Levenkron, because it is the expression of unformulated, dissociated inner experiences Joanna is in the process of appropriating for herself through SBF processes, making implicit content explicit. What Levenkron mirrors is the somatosensory part of Joanna's experience, even if she does not perceive it. When she tells her 'You know, you really should do what you think is best for you', she continues the social biofeedback interaction, according to the SBF perspective, by offering a verbal label that describes what happened for Joanna, a clue that they are completing a shared social biofeedback interaction. Verbal labels are sometimes produced by caregivers during social biofeedback interactions and sometimes not. Mirroring interactions without the production of a precise label of the emotion are still successful, since they sensitize and implicitly represent the emotion. Repeated mirroring interactions around a given emotion will eventually become symbolized with the production of verbal labels ("You feel sad about the loss of your friend", for example). We don't know how Joanna phrased her choice to Levenkron (we can imagine it's possible she could have said: "I want to work with the senior therapist"). A verbal label produced by Levenkron, such as 'you are *excited* about working with the senior therapist', 'or you feel *pleasure* in choosing the therapist you desire to work with', would have been a more precise expression of the feeling being sensitized. A therapist aware of the workings of social biofeedback might aspire to offer such a label. Levenkron's phrasing, while less precise, is more encompassing: it takes into account a more complex process, that of *a self acting* on the excitement or the pleasure a self-inquiry gives her. It expresses that Joanna is the locus of decision and action ('You know, you really should do), that her inner process is paramount ('what you think'), and that it is 'about' what interests or pleasures her most ('is best for

you'). All of these symbols can be used and attached to the implicit representations of the sensation of the emotion, and of the self, until the day the words 'excitement', 'pleasure', or 'joy' get symbolized. That day, Joanna would be able to say (about a potential attachment relationship): '**I'm** *excited*' about working with a particular person, '**I** feel *pleasure* when **I** explore my preferences', or '**I** feel *joy* when **I** choose according to my inner world'. But whether or not this final operation is accomplished is not central to the SBF. Its main goal is to produce sensitized somatosensations, forming implicit representations. Adding a symbolic component to the implicit representation is also part of the SBF, but can be done over many mirroring interactions.

Evidently, the SBF is not the answer to all psychological difficulties, and there are many patients who have sensitized and symbolized emotions that have issues relating to a more mature phase of their development. Yet, the SBF model can aspire to explain an interesting part of the change process in therapy, especially in regard to the self-detection function of the SBF. Returning to the metaphor used above, someone who develops through social biofeedback interactions a full set of sensitized, represented, and symbolized cards of their emotions can use them for the repair of other difficulties in any theoretical framework using symbolization. In this manner, successful SBF interactions represent a portion of the change process for patients who are not already emotionally sensitized and symbolized for certain emotions—probably not "whole" emotions, but emotions as they are activated in certain specific interpersonal contexts (it would be difficult to not be already sensitized to some emotions as an adult), or for those who need to reconnect sensations to representations. But it is what we referred to above as the "birth of the player" that may be

equally interesting in regard to change. The self-detection function of the SBF, helping acquire a more defined sense of self, arises when the sudden control of the mirroring is achieved, fostering self-efficacy and agency, and when the representation and symbolization of a sensitive emotion is anchored in the self. The patient can momentarily be with herself, which would help her find her own position in the relational field, at the same time as she is ensconced in the dyadic activity that fosters the emergence of her singularity. A more defined sense of self would seem to allow for true intersubjectivity, "primarily a here-and-now, you-and-me experience in which both are sharing joint attention as well as similar affect, intention, and meaning" (Hughes, 2004, p. 3). The SBF interaction might represent a portion of the change process for patients who have difficulties related to their sense of self, which could be implicated in relational difficulties. We contend that it is in this manner that Levenkron supported her patient: by helping Joanna use her positive emotions for an attachment relationship and her sense of an instantly autonomous, yet supported self, thereby greatly easing her capacity for affirmation. Joanna becomes a player who can play the self and relational games more successfully.

Given that most relational theories of change (intersubjective, interpersonal, object-relations, relational, attachment, to mention a few) entail a reception and sharing of the patient's emotions, it is fair to suppose that many probably accomplish social biofeedback interactions implicitly. Theories of change that focus on implicit processes and offer surrender to the mirroring needs of the patient can surely foster SBF processes. A difference between many models of change and the SBF is that some aim to give rise to healthy self-representations by transforming relational representations. The SBF aims to

give rise to healthy self-representations through the intrapsychic experience of sensitive, differentiated, conscious, and appropriated emotions. There is no doubt that the SBF is a relational model. It is a dyadic interaction that contains a developmental requisite to use the other as an object: a generous, open, engaged sensor-beamer. Yet it also requires the therapist to bring along the strength of self perspective on the emotional experience he is sharing, that will help the patient experience him and herself as connected yet separate people, as evidenced by the covariance-invariance principle at the core of SBF processes.

We would contend that the SBF is a necessary, and sufficient, model of therapeutic change using sensitization for patients who exhibit difficulties expressing or regulating emotions, especially for those who don't really use symbols to communicate their inner experiences. And because the sensitizing of inner states is a lifelong work-in-progress, it would probably be helpful even for well-organized, neurotic patients who can benefit from classical psychoanalysis. However, the model can be considered sufficient only insofar as the difficulties responsible for sensitization problems not be imbedded in complex interpersonal dynamics, which is pretty rare in adults. In practice, even though the sensitizing of an emotion is an intrapsychic event, its impairment is the result of a failed SBF interaction probably leaving in its wake relational difficulties that will be linked to the experiencing of emotions. These relational difficulties will need to be worked through together with the emotions that need sensitizing. The model doesn't preclude being used concurrently with any other model of change, be it that of Klein, Lacan, Mitchell, or others. The SBF advantages as a model of therapeutic change are that it is fairly simple, as long as the therapist can tolerate being used as a biofeedback object, and in so doing have his inner

somatosensations manipulated. It focuses on the somatosensations of the patient through a therapeutic receptivity to the shared emotion originating in the patient. Much of it need never become explicit, although offering a verbal label of what transpires in the dyad could be necessary for more complete symbolizing. However, very emotionally troubled patients, for whom the sensitization of their emotions and inner states could be too dangerous, might protect themselves by distorting their experience of the mirroring through projective identification, dissociation or splitting, for example. Work on these defense mechanisms might be necessary to help the patient be receptive to the mirroring interaction, for it to be successful. A certain disadvantage of the model is that the emotion has to arise in the patient to become sensitized. A patient who cannot facially express unformulated emotions (even though it is impossible to not experience emotions), because of trauma, attachment style, personality structure or dissociative states, might need mirroring of those she *can* express before she can let the unsensitized, repressed, or disavowed ones come to the fore of the therapeutic inquiry to become sensitive. As Kohut and Wolf (1978) explain, mirroring of the emotions that are not defended against will be required until the dangerous ones start to resurface, to be mirrored. The exploration of the patient's past could be of great help in these situations, stirring up sensitive and unsensitized emotional experiences ripe to be met by a mirroring other. The ability to participate in enactments might also be a gateway to the unformulated feelings. The main disadvantage of the model, like its predecessor, is that it is speculative. And even though the SBF model is more parsimonious than its predecessor, it might be just as difficult to validate through future studies because it is built upon 'silent' implicit processes.

There are limitations to the method used to illustrate the SBF model. Firstly, it is not certain that the sensitization of emotions in adults rests on the same detection processes as that of infants. It is possible that the cognitive development of adults enables them to access different representational pathways that could contribute to the sensitization of their inner states. The vignette used in the present paper might not be able to give us access to these processes. Secondly, Levenkron used her relational approach in her encounter with Joanna, and transposed the change process according to the BCPSG's perspective on their interactions after the fact. It is possible that the change in Joanna leading to her affirmation could be better explained by relational therapeutic actions, rather than by sensitizing processes. Thirdly, it is possible that processes occurring earlier in the vignette than those chosen by Levenkron to examine fostered the change attributed to the mirroring of positive emotions in the exchanges between Joanna and Levenkron. But foremost, the SBF demonstration rests on the analysis of a clinical vignette described by someone else. It is impossible to know what 'really' happened during the exchanges between Levenkron and Joanna. If the vignette had been analyzed from a video format, it is possible that the outcome of the SBF analysis might have been entirely different.

References

BCPSG: Stern, D. N., Lyons-Ruth K., Nahum J. P., Bruschweiler-Stern, N., Morgan A. C., Sander L. W., Harrison, A. M., & Tronick, E. Z. (1998). Non-interpretive mechanisms in psychoanalytic therapy: The 'something more' than interpretation. The Process of Change Study Group. *The International Journal of Psycho-Analysis*. *79*, 903-21.

BCPSG: Stern, D. N., Lyons-Ruth K., Nahum, J.P., Bruschweiler-Stern, N., Morgan, A. C., & Sander, L. W. (2002). Explicating the implicit: the local level and the microprocess of change in the analytic situation. *The International Journal of Psycho-Analysis*. *83* (Pt), 1051-62.

BCPSG: Stern, D. N., Lyons-Ruth K., Nahum, J.P., Bruschweiler-Stern, N., Morgan, A. C., & Sander, L. W. (2005). The “something more” than interpretation revisited: Sloppiness and co-creativity in the psychoanalytic encounter. *Journal American Psychoanalytic Association*. *53*, 693-730.

BCPSG: Stern, D. N., Lyons-Ruth K., Nahum, J.P., Bruschweiler-Stern, N., Morgan, A. C., & Sander, L. W. (2007). The foundational level of psychodynamic meaning: Implicit process in relation to conflict, defense and the dynamic unconscious. *International Journal of Psychoanalysis, 88*: 843-60.

Boston Change Process Study Group, & Nahum, J. (2008). Forms of relational meaning: Issues in the relations between the implicit and reflective-verbal domains. *Psychoanalytic Dialogues*, *18* (2), 125.

Cicchetti, D., & White, J. (1988). Emotional development and the affective disorders. In

W. Damon (Ed.), *Child development: Today and tomorrow*. San Francisco: Jossey- Bass.

Csibra, G., & Gergely, G. (2006). Social learning and social cogniton: The case for pedagogy. In Y. Munakata & M. H. Johnson (Eds.), *Processes of change in brain and cognitive development: Attention and performance XXI* (pp. 249-274). Oxford: Oxford University Press.

Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness*. New York: Harcourt Brace.

Damasio, A. R. (2010). *Self comes to mind: Constructing the conscious brain*. New York: Pantheon Books.

DeOliveira, C. A., Bailey, H. N., Moran, G., & Pederson, D. R. (2004). Emotion socialization as a framework for understanding the development of disorganized attachment. *Social Development*, *13* (3), 437-467.

Ekman, P. (2003). *Emotions revealed: Recognizing faces and feelings to improve communication and emotional life*. New York: Times Books.

Fonagy, P. (2003). The development of psychopathology from infancy to adulthood: The mysterious unfolding of disturbance in time. *Infant Mental Health Journal*, *24* (3), 212-239.

Fonagy, P. (2010, January). *Mentalization and its link to therapeutic alliance: A case for mentalization as common factor in therapeutic change.* Presentation at the American Psychoanalytical Association Conference, New York, NY.

Fonagy, P., Gergely, G., Jurist, E.L., & Target, M., (2002). *Affect regulation, mentalization, and the development of the self*. New-York, Other Press.

Fonagy, P., Target, M., Gergely, G., Allen J. G. & Bateman, A. (2003). The developmental roots of borderline personality disorder in early attachment relationships: A theory and some evidence. *Psychoanalytic Inquiry*, *23*, 412-459.

Fonagy, P., Target, M., & Gergely, G. (2006). Psychoanalytic perspectives on developmental psychopathology. In D. Cicchetti, D. J. Cohen (Eds), *Developmental psychopathology: Volume one,* (pp. 701- 749). Hoboken NJ: John Wiley & Sons.

Gergely, G. (1995a). The role of parental mirroring of affects in early psychic structuration. Paper presented at the Fifth IPA Conference on Psychoanalytic Research, London.

Gergely, G. (1995b). The social construction of self-awareness and first-person authority. Paper presented at the Twelfth SRCD Conference, Indianapolis, IN.

Gergely, G., Koos, O., Watson, J. (2002). Perception causale et rôle des comportements imitatifs des parents dans le développement socio-émotionnel précoce. Dans *Imiter pour découvrir l'humain: Psychologie, neurobiologie, robotique et philosophie de l'esprit*, édité par J. Nadel et J. Decety, 59-82. Paris: PUF.

Gergely, G., & Watson, J. (1996). The social biofeedback theory of parental affect-mirroring: The development of emotional self-awareness and self-control in infancy. *International Journal of Psycho-Analysis, 77*, 1181-1212.

Gergely, G., & Watson, J. (1999). Early social-emotional development: Contingency perception and the social biofeedback model. In P. Rochat (Ed.), *Early social cognition: Understanding others in the first months of life* (pp. 101-137). Hillsdale, NJ: Erlbaum.

Gottman, J. M., & DeClaire, J. (2001). *The relationship cure: A five-step guide for building better connections with family, friends, and lovers.* New York: Crown Publishers.

Hughes, D. A. (2004). An attachment-based treatment of maltreated children and young people. *Attachment & Human Development, 6,* 263-278.

Kohut, H. (1971). The analysis of the self: A systematic approach to the psychoanalytic treatment of narcissistic personality disorders. *The psychoanalytic study of the child*. Monograph, no. 4. New York: International Universities Press.

Kohut, H. (1977). *The restoration of the self*. New York: International Universities Press.

Kohut, H. & Wolf. E. S. (1978). The disorders of the self and their treatment: An outline. *International Journal of Psycho-Analysis, 59,* 413-425.

Levenkron, H. (2009). Engaging the implicit: Meeting points between the Boston Change Process Study Group and relational psychoanalysis. *Contemporary Psychoanalysis*, *45* (2), 179.

Main, M. (1994). *Attachment and psychoanalysis: The phenomena.* Presented as the annual research lecture to the British Psycho-Analytical Society: London.

Malatesta, C. Z., & Haviland, J. M. (1985): Signals, symbols, and socialization. In M. Lewis and C. Saarni (Eds.) *The socialization of emotions*, (pp. 89-115). New York, Plenum Press.

Nahum, J. (1994). New theoretical vistas in psychoanalysis: Louis Sander's theory of early development. *Psychoanalytic Psycholo*gy, *11*: 1-19.

Nishimura, C., Wang, L., Nagase, A., Terada, K., Miyamoto, Y., Tsukuma, H., & Muro, M. (2007). A learning model of autonomic function in biofeedback. *International Congress Series*, *1301*, 119–122.

Oppenheimer, A., & Denis, P. (1998). *Heinz Kohut*. Paris: Presses universitaires de France.

Ornstein P. H. & Kay, J. (1990). Development of psychoanalytic self psychology: A historical-conceptual overview. In A. Tasman, S.M. Goldfinger, and C.A. Kaufmann (Eds.) *American Psychiatric Review of Psychiatry, 9*, 303-323.

Pellerin, N., & Lecours, S. (2012). Sensitization to emotions and representation formation through social biofeedback: Is markedness of the parental mirror a necessary mechanism? Manuscript submitted for publication.

Sander, L. (1983). Polarity, paradox, and the organizational process in development. In J. Call et al. (Eds.), *Frontiers of infant psychiatry*, (pp. 333-346). New York, Basic Books.

Sander, L. (1997). Paradox and resolution. In J. Osofsky (Ed.), *Handbook of child and adolescent psychiatry*, pp. (153-160). New York, John Wiley.

Sauter, D. (2010). More than happy: The need for disentangling positive emotions. *Current Directions in Psychological Science, 19*, 1, 36-40.

Sauter, D. A., Eisner, F., Ekman, P., & Scott, S. K. (2009). *Cross-cultural recognition of basic emotions through nonverbal emotional vocalizations*. National Academy of Sciences.

Steele, H., Steele, M., Croft, C., & Fonagy, P. (1999). Infant-mother attachment at one year predicts children's understanding of mixed emotions at six years. *Social Development*. *8* (2), 161.

Stern, D. N. (1985). *The interpersonal world of the infant: A view from psychoanalysis and developmental psychology.* New York: Basic Books Inc.

Stern, D. N., & Boston Change Process Study Group (2006). Some implications of infant observations for psychoanalysis. In A. M. Cooper (Ed), *Contemporary*

psychoanalysis in America: Leading analysts present their work, (pp. 641-666). Washington, D.C. American Psychiatric Publishing.

Stern, D. B. (1997). *Unformulated experience: From dissociation to imagination in psychoanalysis.* Hillsdale, NJ: Analytic Press.

Tronick, E., Als, H., & Adamson, I. (1979). Mother-infant face-to-face communicative interaction. In M. Bullowa (Ed.), *Before speech: The beginnings of human communication.* Cambridge, Cambridge University Press.

Watson, J. S. (1972). Smiling, cooing, and 'The Game.' *Merrill-Palmer Quarterly*, *18*, 323-339.

Watson, J. S. (1979). Perception of contingency as a determinant of social responsiveness. In E. B. Thoman (Ed.), *The origin of the infant's social responsiveness*, (pp. 33-64). New York: Erlbaum.

Watson, J. S. (1985). Contingency perception in early social development. In T. M. Field and N. A. Fox (Eds.) *Social perception in infants*, (pp. 157-176). Norwood, N. J.: Ablex Pub. Corp.

Watson, J. S. (1994). Detection of self: The perfect algorithm. In S. T. Parker, R. W Mitchell, and M. L. Boccia (Eds.) *Self-awareness in animals and humans: Developmental perspectives* (pp. 131-148). New York: Cambridge U. Press.

Winnicott, D. W., (1957*). The child and the outside world*. Tavistock Publications.

Winnicott, D. W. (1965*). The maturational process and the facilitating environment: Studies in the theory of emotional development*. The Hogarth Press and the Institute of Psychoanalysis, London.

Wolf, E. S. (1988). *Treating the self*. NY, New-York : The Guilford Press.

Chapitre 4 — Discussion

Plusieurs pistes de réflexion ont émergé à la suite de l'élaboration des deux articles présentés ici. La discussion se voulant fidèle à l'esprit spéculatif de l'étude, elle fera lumière sur des considérations restées dans l'ombre lors de l'élaboration des articles, dans le but de soulever des questions pertinentes et aptes à susciter des idées de recherche. L'article présenté au chapitre deux se concentre sur le potentiel du caractère marqué du miroir parental à servir de signaux découplant l'expression parentale du parent, par l'effet d'une exagération faciale et vocale. Bien que l'article fasse la démonstration de la superfluité de ces signaux aux processus de biofeedback social, leur ubiquité dans les échanges entre personnes ayant des liens significatifs justifie d'explorer la nature de ces manifestations ainsi que leurs rôles possibles dans les interactions affectives. Cette exploration permettra de réfléchir sur la pertinence, ou non, de tels comportements dans la pratique thérapeutique avec les adultes. L'article présenté au chapitre trois illustre les processus de biofeedback social à l'aide d'une vignette clinique, démontrant qu'en acceptant de partager l'émotion d'une patiente, un thérapeute peut engager des processus implicites soutenus par l'expression faciale de l'émotion partagée. L'empathie, cette capacité nécessaire à ressentir l'émotion de l'autre pour la partager, se retrouve au cœur des processus de biofeedback social. Elle est aussi une qualité thérapeutique considérée essentielle à la plupart des théories du changement, qu'elle soit relationnelle, interpersonnelle, intersubjective, relation d'objet, ou autre. Est-ce que l'empathie selon le BSF est la même que celle participant à ces autres modèles du changement? Et en quoi est-elle essentielle aux processus de BFS? Cela soulève des questions sur sa nature et sur son

action. En effet, il est pertinent de se demander si l'empathie appréhendée par le prisme du BFS pourrait contribuer à la compréhension clinique du phénomène. Une réflexion sur les éléments physiopsychologiques de l'empathie participera peut-être à générer de l'intérêt envers cette facette d'une des manifestations les plus communicatives des interactions thérapeutiques.

1. Considérations sur le miroir parental 'marqué'

L'article présenté au chapitre deux démontre que la représentation et la symbolisation des émotions est possible sans le miroir parental 'marqué'. Le caractère 'exagéré' de l'expression faciale et de la prosodie de la voix était l'élément tenu responsable du découplage de l'expression parentale du parent lors de comportements de miroir face aux expressions d'émotion de leur enfant, selon Gergely, Koos, et Watson (2002). Mais si ces exagérations comportementales ne sont pas nécessaires au découplage, est-il possible qu'elles remplissent d'autres fonctions importantes pour le BFS ou pour d'autres processus plus interpersonnels? Tout d'abord, d'une réflexion sur ces comportements émerge une question : est-ce que ces exagérations faciales et vocales sont véritablement exagérées ? La question se pose, car bien que Gergely, Koos, et Watson (2002) tiennent cela pour acquis, il est possible que ce ne soit pas le cas. Par exemple, dans le cas de la 'voix de bébé', aussi appelée voix 'adressée' (Busnel, 2001), utilisée lors d'échanges affectifs entre parents et enfants (ou lors d'échanges affectifs avec d'autres partenaires significatifs comme un amoureux, ou même avec un animal de compagnie), c'est la prosodie de la voix qui est particulière : elle est chantante, plus aiguë que la voix normale, affectueuse (Kitamura & Burnham, 2003), chaleureuse, avec un tempo plus lent, et des pauses plus longues que la voix adulte (Kitamura, 1998). Ce n'est pas une exagération du ton de la voix d'une

personne qui ressent une émotion particulière. Le parent ne dit pas au bébé d'un ton exagérément colérique 'tu es en colère', ou d'un ton exagérément triste 'tu es triste'. En fait, les expressions de colère ou de tristesse provoquent des reflets faciaux de tristesse ou de colère chez les parents, mais prennent bien souvent un ton un peu moqueur (Malatesta & Izard, 1984). L'expression de la 'voix adressé' n'est donc pas une expression vocale d'une émotion en plus intense, mais bien une façon particulière de s'exprimer dans une relation affective significative. Ces particularités se retrouvent même dans les échanges par langage des signes entre parents sourds avec leur enfant sourd : les échanges signés diffèrent significativement de la forme utilisée par les parents avec leur amis sourds. Lorsqu'elles communiquent avec leur enfant, les mamans signent avec un tempo plus lent, elles répètent les mêmes signes plus souvent, et leurs mouvements sont quelque peu exagérés (Masataka, 1992). Ce chercheur en conclue que cela sert à capter l'attention de l'enfant (Masataka, 1996, 1998). Quant à l'expression faciale exagérée du miroir parental, comment est-elle exagérée? L'étude des expressions faciales des émotions d'Ekman (2003) souligne le fait que la mince fourchette de variabilité des micro-expressions formant l'expression globale d'une émotion doit être respectée pour pouvoir être identifiée comme telle. Les muscles du visage engagés par chaque émotion doivent l'être très précisément pour que l'expression soit authentique. Il suffit que certains muscles soient engagés ou non pour que l'expression devienne méconnaissable. Bien sûr, chaque émotion peut être exprimée avec plus ou moins d'intensité. Ekman discute aussi de la possibilité d'exprimer plus d'une émotion à la fois, comme une expression de colère engageant les yeux, teintée de mépris engageant le bas du visage. Mais même dans ces cas, les expressions mixtes restent dans la mince fourchette de variabilité qui les caractérise. À moins d'être face à un nouveau-né qui n'utiliserait pas ses

expressions faciales au maximum de ses capacités, il serait peut-être difficile pour un parent d'exagérer l'expression faciale d'une émotion sans la distordre. Donc, la question se pose à savoir si l'expression faciale d'un reflet parental est une exagération de l'expression faciale du nouveau-né. Il semble possible que le miroir puisse être une expression faciale d'une émotion à son maximum d'intensité, sans toutefois l'exagérer ou la caricaturer. Il est aussi possible que l'expression faciale parentale lors d'un miroir semble quelque peu caricaturale puisqu'elle n'est pas l'expression véritable d'un sentiment émanant du parent, mais celle de l'émotion partagée. Cependant, puisqu'elle se doit de se transformer en covariance avec les changements de l'expression émotionnelle de l'enfant, elle se doit de varier en intensité tout comme l'expression du nouveau-né. Il se pourrait qu'elle soit constamment un peu plus intense que l'expression de l'enfant, ce qui correspondrait à une exagération, mais on peut difficilement imaginer un miroir parental de colère ou de détresse plus intense qu'une expression de colère ou de détresse enfantine, si le parent n'est pas lui-même triste ou en colère. Il est donc possible que ni l'expression parentale, ni la voix 'adressée', ne soient exagérées. Ce qui soulève une autre question : Qu'est-ce qui indique d'une expression qu'elle est moqueuse ? Est-ce l'expression faciale, le ton de la voix, ou les mots prononcés lors de l'échange? Car s'il est difficile d'imaginer un parent pouvant avoir l'air plus triste qu'un bébé qui a une grosse peine, il est facile de l'imaginer utiliser une voix 'adressée' moqueuse (aiguë, chantante, affectueuse : 'bébé à de la peine') devenant encore plus moqueuse si combinée à des certains mots ('bébé a de la grosse, grosse peine'). Il est aussi possible d'imaginer que l'expression faciale du parent reflétant la tristesse ou la colère soit teintée d'humour en engageant les muscles des yeux dénotant l'expression d'une émotion positive, ce qui serait une expression mixte, mais restant quand même dans la

fourchette de variabilité de l'émotion reflétée. Donc, l'expression faciale pendant un miroir ne serait peut-être pas exagérée, et la voix 'adressée', sans être exagérée, permettrait de rendre le miroir 'moqueur', tout comme une expression mixte. Quelle fonction assurerait la légère moquerie parentale dans le miroir? Partant de Damasio (2010) qui explique que la prosodie de la voix signale l'état homéostatique de l'individu, nous suggérons que la voix 'adressée' signale en fait l'invariance, ou l'état interne, du parent. Elle permettrait ainsi de contraster l'émotion partagée dans la dyade avec la perspective émotionnelle du parent. Peut-être que la voix affectueuse ou légèrement moqueuse signale que bien que l'enfant soit en détresse ou fâché, la dyade ne l'est pas. La voix 'adressée' non-moqueuse mais seulement calme ou affectueuse accomplirait un but semblable lors d'échanges de BFS avec les enfants. D'ailleurs, il est probable que, même pendant des échanges de BFS avec les adultes, il y ait aussi une prosodie particulière de la voix du thérapeute durant un comportement de miroir, bien que cela soit plus subtil que lors de miroir avec des enfants (Fonagy, 2010). Cette prosodie, bien que non nécessaire aux comportements de miroir, contribue peut-être aux processus de BFS comme signal d'invariance, à moins qu'elle n'ait une portée plus générale : la voix 'adressée' est aussi considérée comme étant un signal 'd'ostention', relevant d'une forme spécifique de communication pédagogique dont le but est de stimuler l'attitude de 'réceptivité pédagogique' de l'enfant, et servant à attirer l'attention du récepteur vers le contenu d'une communication de l'émetteur (Gergely, 2007, Kitamura, 1998). Cette attitude de réceptivité psychologique est-elle souhaitable dans la thérapie des enfants ? Si oui, il serait peut-être bénéfique d'utiliser la voix adressée avec cette clientèle. Il serait par contre difficile de concevoir que cela soit utile pour la thérapie des adultes, qui n'ont pas besoin d'un tel signal pour donner leur attention et apprendre de

l'interaction avec le thérapeute. Ce comportement vocal a-t-il possiblement d'autres fonctions que de maintenir l'attention ou de signaler l'invariance ? Selon Kitamura (1998), la voix adressée, en plus de communiquer l'affectivité, facilite les relations sociales, et l'acquisition du langage. L'ubiquité de l'utilisation de la voix 'adressée' entre les amoureux, entre les parents et leurs enfants, et même avec des animaux de compagnie, nous indique qu'il est possible que cette voix spéciale serve aussi à autre chose. Dans le premier article, nous avons fait l'hypothèse que la voix 'adressée' pourrait signaler de la bienveillance à l'égard de l'enfant. Se pourrait-il que ce soit même un signal d'amour ? Le biologiste Bruce Lipton (2002) a fait la démonstration que l'organisme, comme la cellule, est fondamentalement régie par deux réponses opposées face à son environnement : un mouvement de retrait face à un environnement toxique (ce qu'il appelle un programme de *protection*, mis en évidence dans les comportements de 'se battre ou fuir'), et un mouvement dans la direction d'un environnement contenant des éléments favorisant l'homéostasie (ce qu'il appelle un programme de *croissance*, mis en évidence par des comportements d'excitation, de plaisir, de désir, ou de joie). Les comportements de protection sont physiologiquement coûteux pour l'organisme qui peut difficilement croître si l'environnement est trop stressant. Des comportements de protection trop intenses, ou durant trop longtemps, mèneraient à la mort. Il soutient que le nouveau-né, mais auparavant même le fœtus dans l'espace utérin, est influencé par les conditions environnementales entourant la mère. Le fœtus perçoit ces conditions par la neurochimie voyageant dans le sang de la mère, qui est elle-même influencée par cet environnement. Cette perception aurait un impact direct sur sa physiologie. Si, par exemple, la mère vit dans un environnement aimant et sécuritaire, les messages neurochimiques voyageant jusqu'au

fœtus favoriseraient la croissance du néocortex du bébé (un peu avant sa naissance, et beaucoup après). Alors que si l'environnement est insécurisant et stressant, voire dangereux, c'est alors la croissance de la masse musculaire du fœtus ou de l'enfant qui est privilégiée au détriment de son néocortex. Cet état de fait serait observable déjà pendant la croissance en milieu utérin (Lipton, 2003). Ce qui fait concevoir à Lipton que l'amour et l'affection sont nécessaires à l'acquisition des fonctions cognitives dites 'supérieures' associées au néocortex comme l'empathie, la compassion, ainsi que le sentiment de connexion avec les autres et l'environnement (Lipton, 2002). La voix 'adressée' étant utilisée avec affection avec les enfants, les amoureux, et les animaux de compagnie, peut-être est-elle un signal d'amour, de bien-être environnemental, d'affiliation, de soutien, ou d'intimité. Ce signal favoriserait non seulement la réceptivité à l'apprentissage, mais peut-être aussi une relaxation du système de protection (fight or flight), pour stimuler le système de croissance nécessaire à la construction des structures neuronales supportant le transfert de connaissance du parent vers l'enfant. Si c'était le cas, et que les expressions affectueuses exprimées au sein des relations significatives avaient un impact sur la croissance du cerveau, peut-être serait-il également intéressant de considérer la possibilité que la voix 'adressée' ait un impact positif dans la thérapie des enfants au-delà de la simple ostention. La voix 'adressée' pourrait-elle être souhaitable dans la thérapie des enfants, et celle d'adultes lourdement hypothéqués au niveau de l'empathie et de la compassion ? Proposer d'utiliser une voix affectueuse lors d'échanges de reflet de BFS exigerait du thérapeute une authenticité du sentiment d'affection peut-être difficile à offrir, une problématique qui porte à réfléchir sur son potentiel thérapeutique. La psychologie semble hésiter à se poser des questions sur les impacts relationnels et intrapsychiques des démonstrations d'affection et

d'amour sur la santé mentale, peut-être à cause de leur potentiel d'entraînement vers la 'pente glissante' de l'enchevêtrement affectif thérapeutique. Ce sont des questions intéressantes qui méritent une réflexion plus approfondie.

2. Considérations sur l'empathie

Les processus du BFS permettent à la patiente d'être sensibilisée à son état interne par la capacité de l'objet de reflet d'en mesurer les changements et de transmettre l'information au détecteur de contingence de la patiente. Cependant, avant de mesurer et transmettre l'information relative à ces changements internes, le thérapeute l'appréhende en partageant l'émotion à sensibiliser de sa cliente par empathie. L'empathie est donc la première action du thérapeute durant les processus de BSF, et comme médiateur du changement pourrait expliquer peu de choses de plus que les modèles s'appuyant sur son action. Pour Kohut (1966), la capacité d'empathie naîtrait dans la première relation, celle du nouveau-né avec le parent : « Notre aptitude à pénétrer la psyché d'autrui tient au fait que dans notre structure mentale la plus précoce, les sentiments, les actes, le comportement de notre mère était inclus dans notre soi» (Oppenheimer & Denis, 1998, p. 78). Dans la perspective de Kohut, « L'empathie, seul moyen véritable d'appréhension d'autrui, est l'instrument qui rassemble les données psychologiques ayant trait au monde intérieur » (Oppenheimer & Denis, 1998, p. 28). Cela permet « d'aller au-delà de l'expérience vécue pour permettre de saisir les processus inconscients » (Oppenheimer & Denis, 1998, p. 29). Toutefois, selon eux, pour Kohut «l'empathie n'est pas un acte thérapeutique en soi» (p. 30). De plus, il était opposé à toute « conception attribuant à l'empathie l'essentiel de l'effet thérapeutique» (Oppenheimer & Denis, 1998, p. 30). Il était tout aussi opposé, d'ailleurs, à attribuer l'essentiel de l'effet thérapeutique à l'interprétation. Kohut aurait

contribué à déplacer l'emphase « au sein de la théorie relationnelle (dans son sens le plus large) d'un accent singulier sur l'interprétation en la redirigeant vers l'inclusion de la cocréation d'expériences relationnelles développementales nécessaires» (Greenberg & Mitchell, 1983, p. 366, notre traduction). L'empathie serait un mode d'observation, une compréhension émotionnelle du client obtenue en « se mettant à la place de… » (Oppenheimer & Denis, 1998, p. 28).

L'empathie dans la perspective du BFS, pour faire un écho détourné à Kohut, serait obtenue en « mettant un autre à notre place »: ce serait la capacité du thérapeute d'accepter que lorsqu'il partage l'émotion de sa patiente, son corps même soit transformé par des changements neurochimiques lui permettant de ressentir une expérience physiologique interne similaire à celle de la patiente. C'est sa capacité à tolérer les sensations vives et souvent intenses soulevées par ce partage empathique qui est requise lors d'échanges de biofeedback social. Qu'ils soient provoqués par 'l'hypothèse de rétroaction' d'Ekman, par les actions de neurones miroirs, ou par l'empathie selon Kohut ou Damasio, ces changements neurochimiques dans le 'milieu interne' et les viscères provoquent la stimulation de récepteurs du toucher qui y sont implantés, comme dans le système de circulation sanguine par exemple. De cette façon, partager les émotions d'une autre personne *nécessite d'accepter d'être 'touché'* physiquement, dans l'antre qu'est notre corps, tout en conservant notre intégrité psychologique. Cette intégrité est préservée par la capacité binaire d'être 'distinct' tout en étant 'avec' la patiente, accomplie par le contact à la part somatosensorielle du thérapeute qui n'est pas engagée par la réception de l'émotion simultanément partagée dans la dyade. Le thérapeute ou le parent ayant la capacité de sentir ses propres émotions de **fond** (background emotions) correspondantes à son équilibre

homéostatique et à sa vitalité (par une sensation de calme ou de solidité, par exemple) ne se sentira pas menacé de fusion ou d'annihilation à cause de son intense point de vue corporel définissant sa perspective personnelle, permettant ainsi de former la boucle de feedback sensibilisante qui se réitère au travers de lui. Une sensation de calme s'ancre dans le corps tout entier, dans un contact avec la masse des membres et du tronc, elle même en contact avec les objets et le sol sur lesquels elle repose. Ces sensations se contactent plus facilement à l'aide de techniques de respiration ou de méditation. Selon Hölzel et ses collègues, la méditation transforme le cerveau en transformant les connections neuronales entre entre différentes parties pour permettre de mieux réguler son attention, d'être plus ancré dans son expérience somatosensorielle, de réguler ses émotions par l'acceptation et la nonréactivité, et finalement par un changement dans la perspective du soi où : « Une plus grande conscience des processus internes pourrait remplacer une forme précédente, narrative de référence à soi » (Hölzel, Lazar, Gard, Schuman-Olivier, Vago, & Ott, 2011, p. 549). Ceci favoriserais l'expérience du 'je' (first-person experiencing), l'ancrage dans l'expérience endogène et corporelle des sensations de fond, à l'opposée de l'expérience narrative et symbolique de la pensée. Est-ce que la pratique de la méditation par le thérapeute, ne serais-ce que quelques minutes par jours, ou avant la rencontre de patients partageant des difficultés soulevant de l'intensité relationnelle, serait un outil bénéfique pour la dyade? Il est fort probable que oui, et cette perspective mérite d'être explorée plus à fond. Du point de vue du BFS, l'empathie est la condition nécessaire pour engager le biofeedback social, mais elle n'est pas suffisante pour promouvoir le changement chez la patiente. Le BFS requière du thérapeute qu'il offre que son expérience émotionnelle d'**avant plan** (foreground emotion) soit habitée et transformée, *résonant* avec les

changements apportés à l'état interne de la patiente par son détecteur de contingence, tout en s'appuyant sur les sensations fournies par son émotion d'arrière-plan pour se distinguer de l'expérience émotionnelle de la patiente. Cette 'empathie covariante soutenue par l'invariance' est une habileté que Levenkron met à profit dans son interaction avec Joanna, ce qu'elle nomme de la 'résonnance affective'. En tant qu'analyste relationnelle, et elle suppose que c'est vrai aussi du Groupe de Boston, Levenkron (2009) pense qu'accroître « la résonnance affective est un aspect plus fondamental du travail dyadique thérapeutique » que l'interprétation. Cela « requière de s'abandonner à être avec le patient de manières qui vont au-delà, et parfois loin au-delà, de son répertoire habituel » (p. 198, notre traduction). Levenkron (2009) propose qu'un thérapeute doive pouvoir céder le contrôle d'une partie de lui-même : elle ne fait pas référence à la flexibilité, bien que cette dernière soit implicite, pas plus qu'elle ne « parle de connexion, même si c'est un but à atteindre, mais plutôt d'une forme de ce que Ghent (1990) a appelé *s'abandonner* » (Levenkron, 2009, p. 198, emphase ajoutée, notre traduction). Cette capacité d'abandon d'une partie de soi aux besoins d'un autre serait naturelle aux parents dans ce qui a été appelé par Winnicott 'la préoccupation maternelle primaire', où la mère 'assez bonne' s'abandonne à rencontrer les besoins de son nouveau-né (1965). Pour Levenkron, cet abandon inclus aussi un appui sur les capacités du thérapeute à se connecter à lui-même : « Le changement dans la dyade devient possible dans la mesure où l'analyste peut utiliser *sa subjectivité* de façon créative dans le ici et maintenant pour transformer le champ tout en maintenant le contact » (p. 198, emphase ajoutée, notre traduction). La capacité de s'abandonner à être touché, 'remué' par l'expérience interne de l'autre alliée à la capacité de connecter à sa propre expérience de vitalité émotionnelle permet de préserver son

intégrité psychique des risques liés à l'abandon d'une part de son expérience émotive aux besoins d'une autre. Par exemple, malgré l'apparente contradiction entre les émotions positives d'avant plan que Levenkron partage avec Joanna et les émotions négatives de fond qu'elle ressent par rapport à sa perspective personnelle sur l'interaction (tension, irritabilité, etc.), Levenkron reste calme, équilibrée, et organisée et continue à refléter les émotions exprimées par sa cliente. En bref, elle semble démontrer cette capacité binaire, qui peut être conçue comme étant 'l'utilisation de ses capacités empathiques abandonnées aux processus de BFS de la patiente, soutenues par le contact avec sa subjectivité', vécue par le thérapeute comme étant de la 'résonnance émotionnelle'. Cette réflexion sur l'empathie soulève d'intéressantes questions : serait-ce possible de résoudre des difficultés de résonnance émotionnelle en étudiant les capacités à s'abandonner ou à s'ancrer subjectivement, ainsi que les difficultés qui les sous-tendent? Serait-ce possible pour un thérapeute qui ne ressentirait pas d'empathie pour une cliente particulière de la provoquer en produisant consciemment un miroir des changements d'expression faciale de sa patiente? Ce sont des questions intéressantes qui méritent sûrement d'être étudiées plus en profondeur.

Bibliographie

Bateman, A. & Fonagy, P. (2003) The development of an attachment based treatment program for borderline personality disorder. *Bulletin of Menninger Clinic, 67*(3), 187-211.

Bateman, A., & Fonagy, P. (2004). *Psychotherapy for borderline personality disorder: Mentalization-based treatment*. Oxford: Oxford Univ. Press.

Bakerman, R. & Adamson, L. B. (1984). Coordinating attention to people and objects in mother-infant and peer-infant interaction. *Child Development*, 55(4), 1278-89.

Busnel, M-C. (2001). Audition fœtale et réactivité prénatale à la voix maternelle « voix adressée », in *Que savent les fœtus ?*, ERES, p. 35-49.

Campbell, N. A., & Reece J. B. (2005). *Biology*, 7th ed. San Francisco: Pearson Education.

Caron R. F., Caron, A. J., & Myers, R. S. (1985). Do infants see emotional expressions in static faces? *Child Development, 56*, 1552-1560.

Damasio, A. R. (1999). *Le sentiment même de soi: Corps, émotions, conscience*. Paris: Ed. Odile Jacob.

Damasio, A. R. (2010). *Self comes to mind: Constructing the conscious brain*. New York: Pantheon Books.

Ekman, P. (2003). *Emotions revealed: Recognizing faces and feelings to improve communication and emotional life*. New York: Times Books.

Fonagy, P. (2003). The development of psychopathology from infancy to adulthood: The mysterious unfolding of disturbance in time. *Infant Mental Health Journal*, *24*(3), 212-239.

Fonagy, P. (2010, January). *Mentalization and its link to therapeutic alliance: A case for mentalization as common factor in therapeutic change.* Presentation at the American Psychoanalytical Association Conference, New York, NY.

Fonagy, P., Gergely, G., Jurist, E.L., & Target, M., (2002). *Affect regulation, mentalization, and the development of the self*. New-York, Other Press.

Fonagy, P., Target, M., Gergely, G., Allen J. G. & Bateman, A. (2003). The developmental roots of borderline personality disorder in early attachment relationships: A theory and some evidence. *Psychoanalytic Inquiry*, *23*, 412-459.

Fonagy, P., Gergely, G., & Target, M. (2007). The parent-infant dyad and the construction of the subjective self. *Journal of Child Psychology and Psychiatry*, *48*:3/4, 288-328.

Gergely, G. (2007). The social construction of the subjective self: The role of affect-mirroring, markedness, and ostensive communication in self development. In Mayes, L., Fonagy, P., & Target, M. (Eds.). *Developmental Science and Psychoanalysis: Integration and innovation*, (pp. 45-82). London, England: Karnac Books.

Gergely, G., & Watson, J. (1996). The social biofeedback theory of parental affect-mirroring: The development of emotional self-awareness and self-control in infancy. *International Journal of Psycho-Analysis, 77*, 1181-1212.

Gergely, G., & Watson, J. (1999). Early social-emotional development: Contingency perception and the social biofeedback model. In P. Rochat (Ed.), *Early social*

cognition: Understanding others in the first months of life (pp. 101-137). Hillsdale, NJ: Erlbaum.

Gergely, G., Koos, O., Watson, J. (2002). Perception causale et role des comportments imitatifs des parents dans le développement socio-émotionnel précoce. Dans *Imiter pour découvrir l'humain: Psychologie, neurobiology, robotique et philosophie de l'esprit*, édité par J. Nadel et J. Decety, 59-82. Paris: PUF.

Ghent, E. (1990). Masochism, submission, surrender—Masochism as a perversion of surrender. *Contemp. Psychoanal., 26*: 108-136.

Greenberg, J., & Mitchell, S. (1983). *Object relations in psychoanalytic theory*. Cambridge, MA: Harvard University Press.

Haviland, J. M., & Lewicka, M. (1987). The induced affect response: 10-week-old infant's responses to three emotions expressions. *Developmental Psychology, 23,* 97-104.

Hölzel, B., Lazar, S., Gard, T., Schuman-Olivier, Z., Vago, D., & Ott, U. (2011). How Does Mindfulness Meditation Work? Proposing Mechanisms of Action From a Conceptual and Neural Perspective. *Perspectives on Psychological Science, 6*, 6, 537-559.

Kahana-Kalman, R., & Walker-Andrews, A. S. (2001). The role of person familiarity in young infant's perception of emotional expressions. *Child Development, 72,* 352-359.

Kitamura, C. (1998). *Infant preference for age-related infant-directed speech: The salience of vocal affect.* Production and perception of infant directed speech. University of New South Wales.

Kitamura, C., & Burnham, D. (2003). Pitch and Communicative Intent in Mother's Speech: Adjustments for Age and Sex in the First Year. *Infancy, 4*, 1, 85-110.

Kohut, H. (1966). *Formen und umformungen des narzissmus*. Stuttgart: Ernst Klett Verlag.

Levenkron, H. (2009). Engaging the implicit: Meeting points between the Boston Change Process Study Group and relational psychoanalysis. *Contemporary Psychoanalysis*, *45* (2), 179.

Lipton, B. H. (2002). *Nature, nurture and the power of love: The biology of conscious parenting.* Jenny Myers Productions & Spirit 2000, Inc. Memphis, TN: Spirit 2000, Inc.

Lipton, B. H. (2003). *The new biology: Where mind & matter meet*. Jenny Myers Productions & Spirit 2000 Inc. Memphis, TN: Spirit 2000, Inc.

Masataka, N. (1992). Motherese in a signed language. *Infant behavior and development 15,* 4: 453-460.

Masataka, N. (1996). Perception of motherese in a signed language by 6-month-old deaf infants. *Developmental Psychology, Vol 32*(5), 874-879. doi: 10.1037/0012-1649.32.5.874

Masataka, N. (1998). Perception of motherese in Japanese sign language by 6-month-old hearing infants. *Developmental Psychology, Vol 34*(2), 241-246. doi: 10.1037/0012-1649.34.2.241

Moses, L. J., Baldwin, D. A., Rosicky, J. G., & Tidball, G. (2001). Evidence for referential understanding in the emotions domain at twelve and eighteen months. *Child Development, 72*, 718-735.

Niedenthal, P. (2007). Embodying emotions. *Science, Vol. 316*, no. 5827, 1002-1005. DOI: 10.1126/science.1136930

Nishimura, C., Wang, L., Nagase, A., Terada, K., Miyamoto, Y., Tsukuma, H., & Muro, M. (2007). A learning model of autonomic function in biofeedback. *International Congress Series*, *1301*, 119–122.

Oppenheimer, A., & Denis, P. (1998). *Heinz Kohut*. Paris: Presses universitaires de France.

Ridgeway, D., Waters, E., & Kuczaj, S. A., II. (1985). Acquisition of emotion-descriptive language: Receptive and productive vocabulary norms for ages 18 months to 6 years. *Developmental Psychology, 21,* 901-908.

Rochat, P. & Hespos, S. J. (1997). Differential rooting response by neonates: Evidence for an early sense of self. *Early Development and Parenting, 6*(3 & 4), 105–112.

Soken, N. H. & Pick, A. D. (1999). Infant's perception of dynamic affective expressions: Do infants distinguish specific expressions? *Child Development, 70,* 1275, 1282.

Solms, M., & Turnbull, O. (2002). *The brain and the inner world*. New York, Other Press.

Watson, J. S. (1972). Smiling, cooing, and 'The Game.' *Merrill-Palmer Quarterly*, *18*, 323-339.

Watson, J. S. (1979). Perception of contingency as a determinant of social responsiveness. In E. B. Thoman (Ed.), *The origin of the infant's social responsiveness*, (pp. 33-64). New York: Erlbaum.

Watson, J. S. (1985). Contingency perception in early social development. In T. M. Field and N. A. Fox (Eds.) *Social perception in infants*, (pp. 157-176). Norwood, N. J.: Ablex Pub. Corp.

Watson, J. S. (1994). Detection of self: The perfect algorithm. In S. T. Parker, R. W Mitchell, and M. L. Boccia (Eds.) *Self-awareness in animals and humans: Developmental perspectives*, (pp. 131-148). New York: Cambridge U. Press.

Widen, S.C. & Russell, J. A. (2008). Young children's understanding of other people's emotions. In M. Lewis, J. M. Haviland-Jones and L. F. Barrett (Eds.) *Handbook of emotions*, (pp. 348-363). New-York: Guilford Press.

Winnicott, D. W. (1965*). The maturational process and the facilitating environment: Studies in the theory of emotional development*. The Hogarth Press and the Institute of Psychoanalysis, London.