

EMPATHY, OUTWARDNESS AND EMPATHY PERSONAL DISTRESS: -A PILOT STUDY-

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ABSTRACT

According to phenomenological tradition we consider empathy a basically prereflexive experience of another as an embodied subject of experience like oneself. However, empathy is a complex neuropsychological ability strictly linked with complex intersubjective processes, therefore involving conscious-reflexive cognition as well.

According to Dziobek et al. (2008) two main approaches have been used to study empathy: First one focuses on cognitive empathy or the ability to take the perspective of another person and to infer his mental state (Theory of Mind). The second approach emphasizes emotional or affective empathy (Eisenberg & Miller, 1987) defined as an observer's emotional response to another person's emotional state. To the best of our knowledge empathy has been studied mostly within psychopathological subjects. The nature of empathy as a process with at least partially dissociated sub-components becomes evident (Blair, 2005).

Our purpose in this paper is to verify whether healthy subjects show different ways of empathizing according to their personality style. Previous researches on the topic demonstrated a connection between personality styles and the recruitment of different neural networks as a consequence of exposure to emotional stimuli. As a measure of empathy we administered the Interpersonal Reactivity Index -IRI- (Davis, 1980). Different personality styles have been evaluated by the administration of Personality Style Questionnaire (QSP; Picardi et al., 2003).

We expect that high levels of outwardness positively correlate with emotional empathy. Outwardness is a measure of the tendency to focus on a frame of references that predominantly uses an externally anchored coordinate system, i.e. contexts or persons, to discriminate among own internal emotional states. Specifically, we found a correlation between high levels of IRI "Personal Distress Scale" and outward personality style. Interestingly, we also found a positive correlation between PD sub-scale and field-dependent participants. Results show that as much as a person's emotional domain depends by evaluation of others, the more a person is sensitive to emotional empathy.

Keywords: empathy, psychopathology, Personality Styles.

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1. DEFINING EMPATHY

Empathy is a polysemic notion: *“There are probably nearly as many definitions of empathy as people working on the topic”* (De Vignemont & Singer, 2006). According to phenomenological tradition we consider empathy - or *Einfühlung* - a basically prereflexive experience of another as an embodied subject of experience like oneself. Recent works on mirror neurons system (MNS) lead neuroscience to build up a coherent phenomenological conceptual framework about the nature of empathy. In his work (2008), Gallese asserts that the other’s emotion is constituted and directly understood by means of embodied simulation producing an “as-if” experience engendered by a shared body state. It is the body state shared by observer and observed that enables direct understanding.

According to this approach, a common underlying functional mechanism—embodied simulation—mediates our ability of sharing the meaning of actions, feelings and intentions with others, thus grounding our identification with others.

However, empathy is strictly linked with complex intersubjective processes, therefore involving conscious-reflexive cognition. Social emotions like envy and gloating (Shamay-Tsoory et al., 2008) necessarily involve super-ordinate cognitive abilities. Therefore, Preston and de Waal (2002) have argued that “empathy [is] a super-ordinate category that includes all sub-classes of phenomena that share the same mechanism. This includes emotional contagion, sympathy, cognitive empathy, helping behavior, etc.” (p. 4). Another position, assumed by Blair (2005), point out that “empathy” subsumes a variety of dissociable neurocognitive processes.

Three main divisions, each reliant on at least partially dissociable neural systems, will be identified: cognitive (the individual representation of the internal mental state of another individual), motor (occurs when individual mirrors the motor responses of the observed actor) and emotional empathy (dissociable in two forms: the response to the emotional display of others and the response to other emotional stimuli). According to Dziobek et al. (2008) two main approaches have been used to study empathy: First one focuses on cognitive empathy or the ability to take the perspective of another person and to infer his mental state. This ability could be assimilated to Theory of Mind (ex.: Kohler, 1929; Baron-Cohen & Wheelwright, 2004). The second approach emphasizes emotional or affective empathy (Eisenberg & Miller, 1987) defined as an observer’s emotional response to another person’s emotional state.

Finally, other researchers suggest a multi-dimensional approach that considers emotional and cognitive empathy as two separate but related constructs (Davis, 1980; 1983).

By a neuropsychological perspective, Theory of Mind, emotional empathy and motor empathy do share a degree of anatomical overlap in superior temporal regions. Theory of Mind seems related to activity in anterior paracingulate cortex, the temporal-parietal junction and inferior temporal cortex. Inferior Frontal Gyrus (IFG) seems crucial for a correct functioning of emotional empathy (Shamay-Tsoory et al., 2008). For a review about neuroanatomical components of the different constructs of empathy see Blair (2005). Interestingly, a recent research (Minio-Paulello et al., 2008) on Asperger's subjects observation of other's pain demonstrates absence of embodied empathy in Asperger Syndrome (AS). This research provides neurophysiological evidence for reduced empathic sensorimotor resonance although AS competences in affective qualities of imagined pain was similar to control participants. This could be an evidence to the nature of empathy as a process with at least partially dissociated sub-components.

Finally, in a review on this topic by Singer (2006), it is proposed that even though T.o.M. and empathy are often used as synonyms in the literature, they represent different abilities that rely on different neuronal circuitry. ToM refers to human ability in understanding mental states such as intentions, goals and beliefs, and relies on structures of the temporal lobe and the pre-frontal cortex, while empathy refers to our ability to share the feelings (emotions and sensations) of others and relies on sensorimotor cortices as well as limbic and para-limbic structures. In his review, the author suggests

“It is further argued that the concept of empathy as used in lay terms refers to a multi-level construct extending from simple forms of emotion contagion to complex forms of cognitive perspective taking. Future research should investigate the relative contribution of empathizing and mentalizing abilities in the understanding of other people's states. Finally, it is suggested that the abilities to understand other people's thoughts and to share their affects display different ontogenetic trajectories reflecting the different developmental paths of their underlying neural structures. In particular, empathy develops much earlier than mentalizing abilities, because the former relies on limbic structures which develop early in ontogeny; whereas the latter rely on lateral temporal lobe and pre-frontal structures which are among the last to fully mature”.

2. EMPATHY AND PSYCHOPATHOLOGY

Every impairment of the ability in sharing another person's inner life causes inevitably a diminished ability to relate with others human beings, producing a deficit in social functioning. The link between empathy and psychopathology will be at first described according to three major syndromes: Pervasive Developmental Disorders (Autism and Asperger Syndrome), Psychopathy, and Alexithymia (ALEX).

2.1. Autism and Pervasive Developmental disorders

Autism is a severe developmental disorder. The main criteria for the diagnosis in DSM-IV-r can be synthesized as a qualitative impairment in social communication, and restricted and repetitive patterns of behaviors and interests. With respect to empathy dysfunction in autism, several studies demonstrate Theory of Mind impairment (es.: Hill & Frith, 2003). Neuroimaging studies have reported reduced activation in three brain critical regions for mentalization in healthy subjects (the temporal poles, temporal-parietal junction and medial prefrontal cortex; Castelli et al., 2002). Motor empathy is reasonably impaired in autistic subjects for clear evidence of their deficit of imitation. With respect to emotional empathy it is still difficult to affirm autistic subjects are effectively impaired. Several studies have found emotional deficit in autistic subjects but it is reasonable that these researches have used complex cognitive emotions requiring the representation of the mental states of others (es.: Bormann-Kischkel et al., 1995). Recently, Minio-Paluello, Baron-Cohen et al. (2008) have explored whether people with Asperger Syndrome differ from neurotypical control participants in their empathic corticospinal response to the observation of others' pain. Briefly, corticospinal excitability recorded from the specific body part that is vicariously affected by the observed painful stimulation is reduced in neurotypical subjects. Using a single-pulse transcranial magnetic stimulation (TMS) Minio-Paluello et al., outline that AS subjects do not display significant sensorimotor contagion, that is no significant reduction of corticospinal excitability.

However, Hamilton et al. (2007) reported that children with autistic spectrum disorders, despite their deficit in ToM tasks, have no impairments on a complex performance on a gesture recognition task, even though all of these tasks are thought to rely on the classical motor MNS in healthy subjects. In addition,

autistic people showed lowered MNS-related neural activity than normative controls when observing emotional facial expressions (Dapretto et al., 2006) and meaningless hand movements (Williams et al., 2006) as well as lower neural activity on a ToM task as above mentioned. Indeed, Hamilton et al. (2007) proposed that the classical MNS involved in object-directed hand movements is intact in autistic people, though other MNS components (e.g., regarding emotional recognition) are impaired.

On the other way round, in a research by Dziobek et al. (2008), authors by using a new photo-based measure to assess empathy multidimensionally - Multifaceted Empathy Test (MET) -, have found that while individuals with AS are impaired in cognitive empathy, they do not differ from controls in emotional empathy. Level of general emotional arousability and socially desirable answer tendencies did not differ between groups. Internal consistency of the MET's scales ranged from .71 to .92, and convergent and divergent validity were highly satisfactory.

2.2. Psychopathy

A psychopathology often considered as symptomatically specular to Asperger is Psychopathy. This psychopathology shows significant impairment in emotional empathy but normal processes in cognitive empathy

As Blair (2005) points out psychopathy is a developmental disorder, usually appearing in early childhood and continuing throughout the lifespan. Individuals with psychopathy are marked by pronounced emotional (considerably reduced empathy and guilt) and behavioral disturbance (criminal activity and violence). Psychopathy can be considered one of the prototypical disorders associated with empathic dysfunction. Reference to empathic dysfunction is part of the diagnostic criteria of psychopathy. There are no indications of Theory of Mind impairment in individuals with psychopathy. Three out of four studies assessing the ability of individuals with psychopathy on Theory of Mind measures have reported no impairment. As noted above, the clinical description of psychopathy includes reference to a lack of empathy. This description has been substantiated empirically. Individuals with psychopathy show reduced vicarious conditioning; i.e., reduced autonomic responses to stimuli associated with the distress of another individual. In addition, both adults with psychopathy and children with psychopathic tendencies show reduced autonomic

responses to the sad expressions of others. Several studies have examined the ability of individuals with psychopathy to recognize the facial or vocal emotional expressions of others. In short, the empathic dysfunction shown by individuals with psychopathy appears relatively selective. Individuals with psychopathy are impaired when processing fearful, sad (in adulthood, if responsiveness is indexed by skin conductance responses (SCRs), in childhood whether by SCR or recognition score), and possibly disgusted expressions. No study has yet reported that individuals with psychopathy show impairment for the processing of angry, happy or surprised expressions.

2.3 Alexithymia

Another psychopathology that has been correlated with empathies impairment is alexithymia (ALEX), (Moriguchi et al., 2007; 2008). Although the concept of alexithymia was originally used to describe the characteristics of psychosomatic patients, recently it has been used to refer to deficits in emotional functioning in broader populations (ex.: Taylor & Bagby, 2004). In fact, because awareness of Self emotional states is a prerequisite to recognizing such states in others, alexithymia - difficulty in identifying and expressing one's own emotional states - should involve some impairment in empathy.

Using functional magnetic resonance imaging (fMRI), Moriguchi et al., (2007) compared an ALEX group with healthy subjects for their regional hemodynamic responses to the visual perception of pictures depicting human hands and feet in painful situations. Subjective pain ratings of the pictures and empathy-related psychological scores were also compared between the 2 groups.

The ALEX group showed less cerebral activation in the left dorso-lateral prefrontal cortex (DLPFC), the dorsal pons, the cerebellum, and the left caudal anterior cingulate cortex (ACC) within the pain matrix. The ALEX group showed greater activation in the right insula and inferior frontal gyrus.

Furthermore, alexithymic participants scored lower on the pain ratings and on the scores related to mature empathy. In conclusion, the hypofunction in the DLPFC, brain stem, cerebellum, and ACC and the lower pain-rating and empathy-related scores in ALEX are related to cognitive impairments, particularly executive and regulatory aspects, of emotional processing and support the importance of self-awareness in empathy. Interestingly, ALEX group scored lower on the Interpersonal Reactivity Index (IRI)

scales assessing “perspective taking” and “empathic concern,” suggesting that they were less able to take the perspective of another and had less empathy but, on the other hand, alexithymics had significantly higher “personal distress” scores on the IRI. In a subsequent research, Moriguchi et al. (2008) measured the hemodynamic signal to examine whether there are functional differences in the mirror neuron system’s (MNS) activity between participants with ALEX and without ALEX, in response to a classic MNS task (i.e., the observation of video clips depicting goal-directed hand movements). Both groups showed increased neural activity in the premotor and the parietal cortices during observation of hand actions. However, activation was greater for the ALEX group than the non-ALEX group. Furthermore, activation in the left premotor area was negatively correlated with perspective-taking ability as assessed with the IRI. By following these results, authors suggest that the stronger MNS-related neural response in individuals scoring high on ALEX is associated with their insufficient self-other differentiation.

Authors’ investigations demonstrate that, although ALEX itself refers to deficiencies in emotional self-awareness, it is often marked by a lack of understanding of the feelings of others. ALEX has been repeatedly found in broad spectrum of psychiatric disorders (e.g., substance use disorder, post-traumatic stress disorder, and dissociative disorders). At the same time, it is noteworthy that there is a considerable group of psychiatric disorders characterized by ALEX involving deficits in the recognition of feelings belonging to the self and identification with others, such as autism and Asperger Syndrome (AS), schizophrenia, and borderline personality disorder. These disorders are characterized by reduced self-other distinction and immature empathy, such as higher self-oriented personal distress or emotional contagion. Furthermore, recent studies utilizing functional neuroimaging revealed that individuals with ALEX have reduced mentalizing capability, cognitive empathy, and perspective-taking ability. These results point to common components in the recognition of the self and others; therefore, ALEX involves impairments both in self-awareness and also in understanding the perspective of others at a higher cognitive level.

3. EMPATHY AND PERSONALITY

Until now, individual differences in empathizing have been described as a consequence of psychopathology (ex.: Asperger, Psychopathy, ALEX, etc.). Although these researches cannot be

summarized into a clear conceptual framework for empathy, we try to point out some experimental evidences.

Empathy is a upper-ordinate category that includes different sub-classes of phenomena. This includes emotional contagion, sympathy, cognitive empathy, helping behavior, etc. (Preston & de Waal, 2002). By following these authors, the different sub-classes of phenomena share the same basic mechanism. Gallese (2008) asserts that a common underlying functional mechanism—embodied simulation—mediates our ability of sharing the meaning of actions, feelings and intentions with others, thus grounding our identification with others. Furthermore, Blair (2005) considers these phenomena as neurocognitive dissociable modules. By the way, is yet to be demonstrated that:

- a) Those sub-classes of phenomena compose a continuum pathway of a single ability, being embodied simulation and ToM the continuum extremes;
- b) It is not clear how different forms of empathy are neurologically dissociable, that is, how they share common and different neural networks.

Authors found some researches on the relation between empathy and personality traits, for example psychometric studies on the relation between personality inventories vs. empathy scales (es.: Johnson et al., 1983). Interestingly, some researches have evaluated how different personality styles are associated with differential modulation of brain activity during explicit recognition of fearful and angry facial expressions (Rubino et al., 2007). Authors found that different personality styles are associated with differential modulation of brain activity during explicit recognition of fearful and angry facial expressions.

The supporting theory of personality is the cognitive post-rationalist one (Arciero & Guidano, 2000). Results can be shortly summarized: Inward subjects (whose identity is more focused on the inner experience and around control of environmental threat) recruit greater neuronal resources in medial prefrontal cortex (mPFC) compared to outward subjects (subjects, whose identity is more focused on external referential contexts and much less around control of threatening stimuli). MPFC activity is associated with cognitive aspects that are closely intertwined with emotional processing. In a previous study, Bertolino, Arciero et al. (2005) found that aspects of personality style are rooted in biological responses of the fear circuitry associated with processing of environmental information.

4. A PRELIMINARY STUDY ON DIFFERENT WAYS OF EMPATHIZING ACCORDING TO INWARDNESS-OUTWARDNESS PERSONALITY DIMENSIONS

4.1. The rationale

Our aim was to verify whether healthy subjects show different ways of empathizing according to their personality style. As a measure of empathy we administered the Interpersonal Reactivity Index (IRI) (Davis, 1980; 1983; 1996). The IRI consists of four scales, each measuring a distinct component of empathy: 1) Empathy Concern, feeling emotional concern for others; 2) Perspective Taking, cognitively taking the perspective of another; 3) Fantasy, emotional identification with characters in books, films etc.; 4) Personal Distress, negative feelings in response to the distress of others. Different personality styles have been evaluated with the Personality Style Questionnaire (QSP) (Picardi et al., 2003). QSP is based upon Guidano's post-rationalist theory (Guidano, 1991; Arciero & Guidano, 2000) as later modified by Arciero (2006). Personality styles are grouped into four clusters, respectively: obsessive-prone, dap-prone, depressive-prone, phobic-prone. By following post-rationalist theory, obsessive-prone and dap-prone are outward personality styles, that is, they are more focused on a frame of references that predominantly uses an externally anchored coordinate system, i.e. contexts or persons, to discriminate among own internal emotional states. The other group, composed by depressive-prone and phobic-prone, are inward personality styles, that is, they are more focused on the inner frame of references that predominantly uses a body-centered coordinates system: they focalize primary on emotions starting with visceral activation to evaluate the events in the world (for example fear). Inward and outward personality styles are on the dimensional continuum inwardness-outwardness. The four main personality styles can be grouped into another pathway by following Witkin theory of field dependence/independence cognitive styles (Witkin et al., 1977). That is, a cognitive style characterized by the propensity to differentiate perceptual and other experiences from their backgrounds or contexts, a person with a weak propensity of this kind being field dependent and a person with a strong propensity field independent. We expected no relevant empathy impairment, meseasured on IRI-scoring, because participants are healthy subjects. Anyway we expected some correlation between self-report scores on IRI and QSP ones. Foremost, we expected outward subjects to score high level of emotional empathy in IRI's

subscale. Our hypothesis comes from previous mentioned studies on alexithymic empathy impairment (Moriguchi et al., 2007; 2008) and, partially, on Asperger subjects (AS) (Minio Paulello et al., 2008). IRI's Personal Distress (PD) subscale, taps the tendency to experience self-oriented distress and discomfort in response to somebody else's distress or misfortune. PD scores may in fact be even higher in AS than control participants. Alexithymic participants showed lower pain ratings than non-alexithymics. They scored lower on the IRI scales assessing "perspective taking" and "empathic concern," suggesting that they were less able to take the perspective of another and had less empathy. Alexithymics scored lower on the SCI scales of "cognitive," "problem solving," and "positive reappraisal," indicating that they were less likely to use these approaches to manage emotional stimuli. On the other hand, alexithymics had significant higher "personal distress" scores on the IRI's PD subscale. This higher score is associated with the alexithymic group greater activation than the non-alexithymic group in parietal and premotor areas, that is, participants with alexithymia activated more parts of their sensory and motor cortices (i.e., bodily regions) than control participants in response to emotional video clips, including the left precentral gyrus (BA4), temporal subgyral lobe, right parietal lobe (BA7), and medial/superior frontal gyrus (BA6), which suggests their over-activated sensorimotor components. This study is consistent with findings in terms of the overactivity in motor-related system in individuals with alexithymia. In his article about this topic Moriguchi (2008) conclude: *"Our results also suggest that individuals with ALEX may stagnate in a basic and primitive level of mentalizing, and that ALEX is related to an immature state of inferring the mental state of others without sufficient self-other differentiation. This may leave individuals with ALEX to be prone to being affected by others, leading to deficiencies in emotional regulation."* As mentioned above, we expected, on the one hand, that high levels of outwardness, the tendency to focus on a frame of references that uses an externally anchored coordinate system (i.e. persons) to discriminate among own internal emotional states, positively correlate with levels of personal distress as scored in PD subscale. On the other hand, we expected no relevant correlation in the inward group. Infact, inward group is more focused on the inner frame of references that predominantly uses a body-centered coordinates system; that is, they focalize primary on emotions starting with visceral activation to evaluate the events in the world.

5. METHODS, PARTICIPANTS, PROCEDURES AND MATERIALS

Our group included 27 subjects between the ages of 30 and 36 years. All subjects spontaneously participated at the experiment and they were randomly extracted from different kinds of post-graduate or specialization courses curricula.

All the subjects were asked to perform two different tests, the QSP (Personality Style Questionnaire; Picardi et al., 2003) and the IRI (Interpersonal Reactivity Index; Davis, 1980, Preston & de Waal, 2002). All the subjects performed the test sessions individually and no fixed times were given to fill the tests.

Two psychotherapists, with more than five years of clinical experience, evaluated each subject with a clinical interview in order to estimate the inwardness/outwardness dimension. Group assignment scored 100% agreement.

The IRI is a 28-item, 5-point Likert-type scale that evaluates four dimensions of empathy: Perspective-Taking, Fantasy, Empathic Concern, and Personal Distress. Each of these four subscales counts 7 items. The Perspective-Taking subscale measures empathy in the form of individuals' tendency to adopt, in a spontaneous way, the others' points of view. The Fantasy subscale of the IRI evaluates the subjects' ability to put themselves into the feelings and behaviours of fictional characters in books, movies, or plays. The Empathic Concern subscale assesses individuals' feelings of concern, warmth, and sympathy toward others. The Personal Distress subscale measures self-oriented anxiety and distress feelings regarding the distress experienced by others.

Table 1 - IRI item examples for each sub-scale

SUB-SCALES	ITEM EXAMPLE
Perspective-Taking	"I try to look at everybody's side of a disagreement before I make a decision"
Fantasy	"I really get involved with the feelings of the characters in a novel"
Empathic Concern	"I often have tender, concerned feelings for people less fortunate than me"
Personal Distress	"When I see someone get hurt, I tend to remain calm"

The QSP inventory is a 68 items self-evaluation questionnaire that evaluates the personality styles through the 4 scales: Obsessive-

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prone, Depressive-prone, Phobic-prone and Eating Disorder-prone dimensions (17 items for each subscale). Matching the single dimensions scores, it's also possible to obtain an estimation through the Inwardness/Outwardness continuum and Field-dependent and Field-independent continuum (Arciero, 2006).

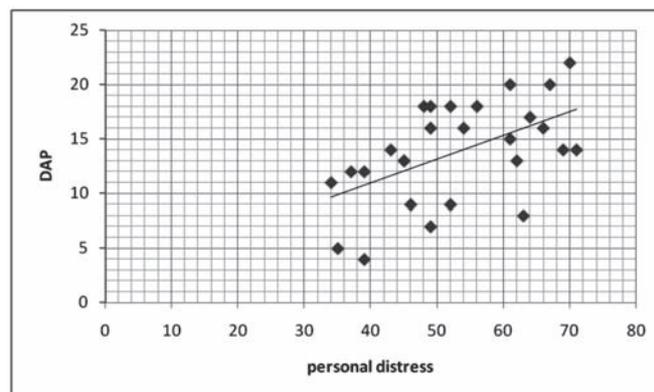
The answers, (same as in the IRI questionnaire) are on a 5-point Likert-type scale.

Table 2 – QSP Outward items example

ITEM	ITEM EXAMPLE
Item 11	"I try to understand what others think about me"
Item 24	"I'm often worried about the possibility that my opinions could be criticized by others"
Item 63	"My own partner jealousy makes me feel very special"

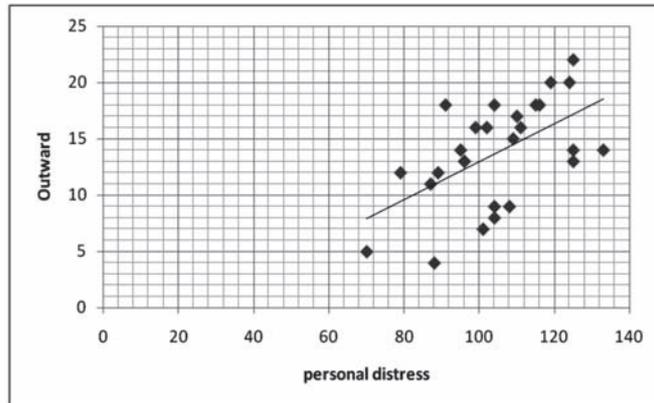
6. RESULTS

We carried out a Pearson correlation test between the QSP scores and the IRI scores. There was a high positive correlation between the DAP scores and the Personal Distress Scale scores. We didn't find any correlation between the DEP, FOB and OSS scores and the other IRI scale scores (Fantasy Scale, Perspective-Taking Scale, Empathic Concern Scale).



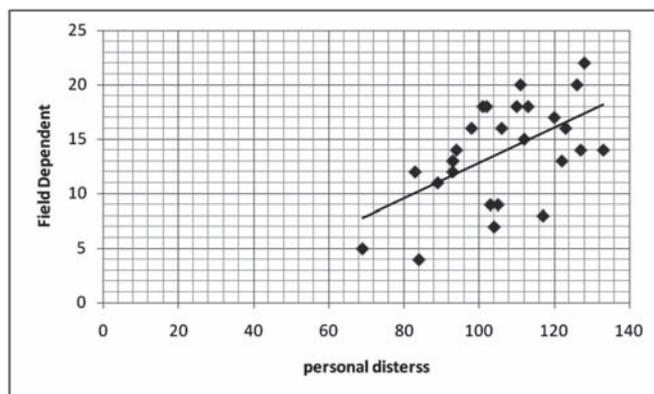
$$(r = .537, N = 27, p < .001)$$

Regarding the Outwardness/Inwardness dimensions we found a high positive correlation between the Outwardness dimension scores and the Personal Distress Scale scores.



$(r = .562, N = 27, p < .001)$

Referring to the Field Dependent and Field Independent personality dimensions and the IRI scores, we found a high positive correlation between the Field Dependent dimension scores and the Personal Distress Scale scores.



$(r = .553, N = 27, p < .001)$

7. DISCUSSION

Our hypothesis about correlation between Personal Distress (PD) sub-scale score and outwardness one has been confirmed. Participants with high score on outwardness personality dimension, measured by the Personality Style Questionnaire (QSP), have a correlate high score on PD sub-scale measured by the Interpersonal Reactivity Index (IRI). As more as person's emotional domain depends by evaluations of others (person and context), as much as the person is sensitive to emotional empathy (in a positive or negative way, depending upon the empathic stimuli). Outward participants show higher distress in front of negative empathic stimuli, because of their higher sensibility to other emotions. Interestingly, we found a positive correlation between PD sub-scale and field-dependent participants. As mentioned above, field-dependent subjects are characterized by a weak propensity to differentiate perceptual and other experiences from their backgrounds or contexts. Logically, these subjects have developed across life span a high intersubjective competences. By the way, our study is just a preliminary research with the intent to verify if emotional empathy correlate, in healthy subjects, with inwardness-outwardness dimensions of personality. As above described this correlation is to be deeper understood in the light of post-rationalist personality theory. We expect that further researches to be focused on the different ways people adopt to empathize, according to their personality style.

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