Group Therapy for Adolescents and Parents: Study of Unconscious Orientation

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Abstract

Introduction: The objective of the study is to explore the presence and the evolution of a common orientation among the participants to two closed groups participating in a Dialectical Behavior Therapy (DBT) skills training. One group is composed by adolescents and the other by some of their parents. The evolution was assessed via their answers to the "absurd questionnaire" and we will analyze the results in the light of the previous experiments we have conducted.
Methods: The "absurd questionnaires", composed of 50 pairs of images was administered to the participants who were asked to choose one image from each pair. In this experiment we were able to submit to the participants a version of the questionnaire before the groups were formed. We have analyzed their initial picture choices and how these evolved over time considering the changes in the choices, the differences in the two groups of participants, the flux and the focus of the answers.
Results: In both groups we found statistical evidence that both the initial choices of the pictures and their evolution during the training are not simply governed by randomness. The initial picture choice in each pair is highly skewed toward one of the two pictures, and there is a statistically significant change in the picture choice in the first part of the training in both groups. The evolution of the picture's choice is compared in the two groups.
Conclusions: The results show that the answers to the questions are strongly polarized before the groups convene, and this reveals an initial socio-cultural bias. The group environment causes a relaxing of this initial strong bias and a subsequent recovery. This could indicate the formation of a "groupal continuum", coming from the entanglement of individuals psyches toward the formation of a groupal unity having its own identity. The adolescents seem to fear this loss of individuality and they tend to abandon the group. The parents, on the contrary, are more constant in the participation to their group, a sign that they are perhaps less exposed to incomplete individuation and clanic loyalties typical of a younger age.

Key Words: Group Dynamics, Group Work, Group Analysis.
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Introduction

Group phenomena occupy and determine a very large portion of our everyday life (Anzieu & Martin 1997). The human being is a gregarious animal in its nature, and group phenomena have been exploited since the dawn of human civilization to organize social life, and they have been studied even before the invention of the psychoanalysis (le Bon, 1895).

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In his work on group dynamics, once established the hypothesis of the existence of a group psyche, Bion proceeds to describe the universal principles ("basic assumptions") that govern the behavior of the group and its evolution in time, in constant interaction with the specific realities and contingent conflicts that characterize any gathering of human beings (Bion 1961; Vergopoulo 1983; Foulkes 1964).

Group phenomena have been studied in-depth (Bion 1961, Foulkes 1964) as a part of psychoanalysis, on the basis of the complementary hypotheses of the existence of a "group psyche" similar in nature to the psyche of the single individual and of the "groupal" nature of the individual psyche (Kaës 2010). These studies have been at the origin of the so called "group-analysis", whose object of study is the psychodynamic of the group as an entity and of the relations between its members and the group itself.

Bion's hypothesis of the existence of a group psychical apparatus, which stands as the cornerstone of group analysis, postulates that, when the working group recedes and the behavior of the group is governed by this entity, the individual members cease to be separated and the group behaves, and can be studied only, as a single system, as long as it remains unperturbed. Formally, this is exactly what happens in the quantum world when a number of microscopic entities interact and form an entangled quantum state (Einstein, Podolsky & Rosen 1935; Bohr, 1935; Schrödinger & Born 1935; Schrödinger & Dirac 1936; Bell 1964; Bell 1966; Aspect, Grangier & Roger 1982, Richens, Selby & Al-Safi, 2017).

Two of the first and most profound scholars from each of these two disciplines, the physicist W. Pauli and the psychoanalyst C.G. Jung worked together in the deep conviction that the same laws that govern Nature at the smallest scale can be employed to describe the human psyche (Jung & Pauli 1952). Following their lead, several authors have explored this field (Baaquie & Martin 2005; Martin & Galli Carminati, 2007; Martin Carminati & Galli Carminati 2010; Martin, Carminati & Galli Carminati 2013; Beck & Eccles 1992; Galli Carminati & Carminati 2006; Galli Carminati & Martin, 2008; Hameroff & Penrose 1996; Penrose 1989; Penrose 1994; Vitiello 2003; Conte et al. 2003; Zurek 1981) that has come to be known as psychophysics. One of the hypotheses that have been formulated is the existence of a universal psychic field of quantum nature (Orlov, 1982; Baaquie & Martin 2005). In a recent series of works (Galli Carminati & Carminati 2006; Galli Carminati & Martin 2008; Martin, Carminati & Galli Carminati 2009; Martin, Carminati & Galli Carminati 2010; Martin, Carminati & Galli Carminati 2013), some of the authors of the present paper have focused on the possibility to describe the group psyche with concepts and models borrowed from Quantum Mechanics.

Some of the authors of this paper have studied the interaction between the unconscious of two individuals in terms of quantum entanglement proposing the hypothesis that parts of the unconscious of two individuals together form a single entangled (non-separable) quantum system, in which distinct quantum entities form a single system, losing their individuality in favor of a single collective behavior. (Galli Carminati & Martin 2008; Martin, Carminati & Galli Carminati 2010; Martin, Carminati & Galli Carminati 2013 , Galli Carminati *et al.* 2013, Trojaola-Zapirain *et al.* 2014, Trojaola-Zapirain *et al.* 2015, Trojaola-Zapirain *et al.* 2016, Galli Carminati, Martin & Carminati, 2017, Trojaola-Zapirain *et al.* 2019 ; Galli Carminati, Martin & Carminati 2017).

Such a model can naturally be extended to a group of individuals (Galli Carminati & Martin 2008; Grinberg-Zylberbaum et al. 1994; Martin & Galli Carminati 2007), where the entanglement between the different unconscious can bring to the formation of a single entity with a distinct behavior, explaining the correlations observed between group members (Marshall 1989).

Materials and Methods

1. Participants

Two different groups of participants are included: one corresponding to adolescents who participate in a Dialectical Behavior Therapy (DBT) skills training group and another group with parents of the former adolescents who participate in another DBT skills training group directed specifically to the parents of the adolescents in the first group mentioned.

The group of adolescents consisted of 7 women with a mean age of 16.43 years. These participants followed a closed DBT skills training group of 16 2-hour sessions, on a weekly basis. An eighth case was excluded from the study because she did not participate in any of the group sessions.

The group of parents was formed by 5 subjects (3 mothers and 2 fathers of some of the adolescents of the other group). It was a closed group of 10 skills

training sessions in Dialectical Behavior Therapy, of 1.5 hours duration, also on a weekly basis.

The participants completed 12 questionnaires. In all cases, questionnaire 0 was completed before the first meeting, and questionnaire 1 before the first group session. The rest of the questionnaires were completed in different sessions depending on each group (adolescents or parents). Table 1 shows the time of completion of each questionnaire for each of the two groups.

The Study was made after the approval of Basurto University Hospital Ethics Committee (Bilbao, Spain), in adherence to the Helsinki Declaration for research with human subjects. All participants gave written informed consent after receiving oral and written information about the experiment, and specifically for adolescents both the participant and their parent or legal tutor signed informed consents. All participant data were coded so that they were completely anonymous, including for the researchers analyzing the data.

Table 1. Time of completion of questionnaires

Adolescent group	Parent group
Q00 before the 1st meeting	Q00 before the 1st meeting
Q01 before 1st group session	Q01 before 1st group session
Q02 after 1st group session	Q02 after 1st group session
Q03 after 2nd group session	Q03 after 2nd group session
Q04 after 3rd group session	Q04 after 3rd group session
Q05 after 5th group session	Q05 after 4th group session
Q06 after 7th group session	Q06 after 5th group session
Q07 after 9th group session	Q07 after 6th group session
Q08 after Q11 group session	Q08 after 7th group session
Q09 after 13th group session	Q09 after 8th group session
Q10 after 15th group session	Q10 after 9th group session
Q11 after 16th group session	Q11 after 10th group session

2. Procedure

Dialectical Behavioural Therapy (Linehan 1993, 2015; Miller *et al.* 2006) has proven to be an effective transdiagnostic therapy in the treatment of adolescents with different pathologies in which the main symptoms are emotional dysregulation and impulsivity. A comprehensive program of this therapy is developed in the Psychiatric Service of Basurto University Hospital (Bilbao, Spain). This program consists of several components, being one of them the skills training groups, both for adolescents and parents.

The skills taught in these groups are: Mindfulness, Distress Tolerance, Regulation of Emotions, Interpersonal Effectiveness and Walking the Middle Path.

The group for adolescents consists of 16 2-hour sessions, on a weekly basis. And the group for parents consists of 10 sessions of 1.5 hours duration, also on a weekly basis.

The groups included in this study were closed. Those groups were run by two therapists in each group.

Prior to joining the group all participants (adolescents and parents) attended a previous interview for evaluation and information on the methodology of the group and the research. During that interview participants filled the informed consent and the questionnaire number 0. In addition, sociodemographic data on adolescents were collected

Each participant was given an identification code to keep their identity anonymous for the research. The general setting of this experiment has been extensively described in the previous publications (Trojaola-Zapirain *et al.* 2014, 2015, 2016, 2019). For the purpose of this work it will be enough to recall that we have used a questionnaire composed of 50 pairs of figures. Participants were asked to select one picture from each pair and to complete the questionnaire in three minutes. The choice of the figures aimed at minimizing the sociocultural bias introduced by a word questionnaire (Zanello et al. 2004). The figures in each pair were always the same but the pairs were randomly reshuffled at each repetition of the test to minimize mnemonic effects. Figure 1 reports a sample page from the questionnaire with fictional picture choices.

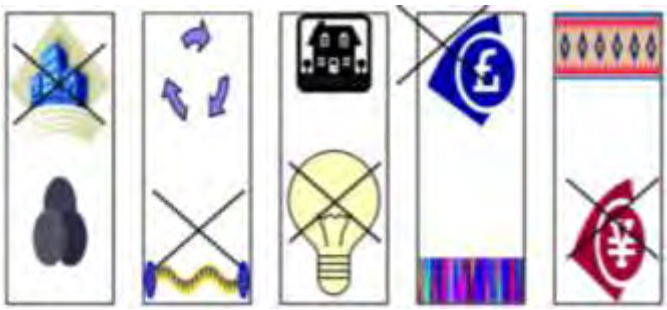


Figure 1. A page from the questionnaire with "fake" answers.

In the present experiment, we involved 12 participants (7 girls, 2 men and 3 women).
The therapy was organized in two closed groups, one of parents and of children. Not all the parents participated. The demographic data we have (age and gender distribution) are in **Error! Not a valid bookmark self-reference**.

Table 2. Demographic, Socio-economical and Group Composition of the Participant Sample the Age of Participants in each Group, Adolescent and Member of their Family

	Subcategories	**Adolescents**		**Parents**		**All**	
	Years	(n = 7)		(n = 5)		(n = 12)	
Age (years) in 2015	14	1	14.3%				
	16	1	14.3%				
	17	4	57.1%				
	18	1	14.3%				
	Median (Q01-Q03)	17	(16.5-17)				
Sex	Female	7	100%	3	60%	10	83%
Living status	2	2	28.5%				
	3b	4	57.2%				
	4b	1	14.3%				

Procedure

Before the beginning of the group therapy, participants filled the socio-demographic form indexed with a code to preserve anonymity. The same code was used to mark the "absurdum questionnaires".
In the present study a "Questionnaire 0" (Q00) was proposed before the beginning of the therapy. Both for the parents and the adolescents we have submitted the Questionnaire 0 before entering the group. Both were submitted a questionnaire at the beginning of the first group and at the end of each of the 10 group sessions (12 questionnaires in total).
The participation has been rather uneven to the different groups, as can be seen in Table 3.

Table 3. Participation to the different sessions

Case	Adolescents								Parents				
Quest	001	002	003	004	005	006	007	008	201	102	202	103	203
Q00	X	X	X		X	X	X	X	X	X	X	X	X
Q01	X	X	X		X	X	X	X		X	X	X	X
Q02	X	X	X		X	X	X	X		X	X	X	X
Q03	X	X	X			X	X	X	X		X	X	X
Q04	X	X	X		X	X	X	X	X	X	X	X	X
Q05	X	X	X		X	X	X		X	X	X	X	X
Q06	X				X		X			X	X	X	X
Q07	X						X		X	X	X	X	X
Q08	X						X		X		X	X	X
Q09	X						X		X	X	X	X	X
Q10	X								X				
Q11	X											X	X

We have to note that the presence in the group of adolescents was less regular after the 5th session.

Data Analysis

For the purpose of the data analysis, the most frequently chosen picture in each pair during the "zero" test (the questionnaire provided before the first meeting) test will be indicated as picture A (A_i, i=1,50), while the other picture will be designed as B (B_i, i=1,50). Frequency tables were computed for each pair of pictures and each one of the 11 sessions. Because the present work is devoted to evaluate the influence of the group unconscious on the measured effects, in this case the answers to the

questionnaire, all statistics were carried out on the proportion of the number of participants choosing picture A or B for each of the 50 questions and 11 tests, irrespectively of how the individual participant's choice evolved.

Given the very uneven participation, we decided not to correct for data that were completely missing. Some of the sheets were incorrectly marked and those we corrected with a LOCF (Last Observation Carry Forward, Hamer & Simpson, 2009) algorithm, using the same answer from the preceding session.

This was applicable since all participants correctly filled the Questionnaire 0. Out of 7200 choices that we should have, 1,850 are missing (25.7% participant not present in the group). We are left with 5,350 choices, out of which 609 (11.4%) are invalid or missing, and that we have reconstructed with the LOCF algorithm.

Results

Evolution of the most Chosen Picture

In Figure 2 we report the evolution of the A's (most chosen picture in the 0'th questionnaire) along the 10 sessions for the parents and the adolescents. Compared to previous studies (Trojaola-Zapirain *et al*., 2014, 2015, 2016, 2019) this provides us with a very important information, i.e. the strong orientation of the initial choice happens before the group forms, and therefore there seems to be a sociocultural factor in the choice of the image. We will indicate with Qnn (nn=00,01,…,11) the results of the nnth questionnaire, where Q00 is the answer to the questionnaire presented before the group meets. We observe however a similar "trend" between the parents and the adolescents, i.e., the initial choice is "defocused" at the beginning of the group sessions and then there is a marked tendency to move back to it.

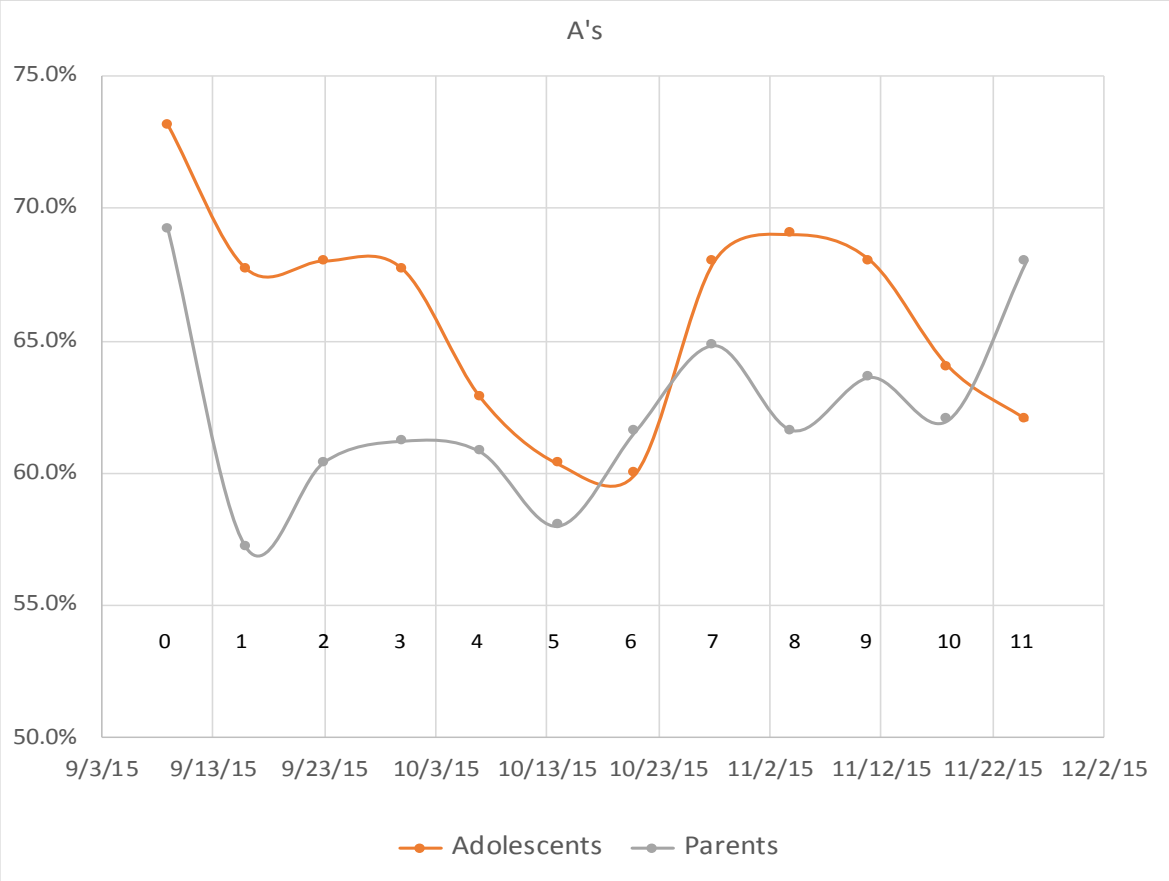
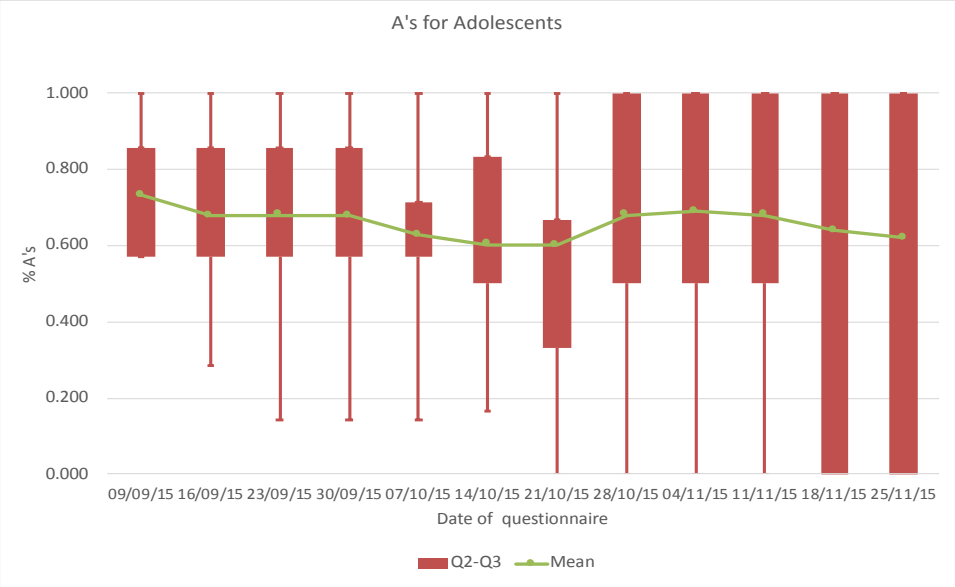


Figure 2. Evolution of the Most Chosen Picture with the 12 Questionnaires for the Parents and the Adolescents

We have however to consider this picture with some caution, insofar as the participation to the groups has been very uneven, as shown in Table 3. In effect, if we plot the quartiles for the two groups, we see that, especially toward the end, we have very large interquartile values (see Figure 3).

Comparing the averages of the two groups with a Mann-Whitney test, we obtain a p of 0.09, which is non-significative but rather low. If, however we normalize so that the first probabilities are equal,

we obtain a p of 0.92. This tells us that while the average initial choice of the parents and the adolescents are different, their relative evolution is quite similar.



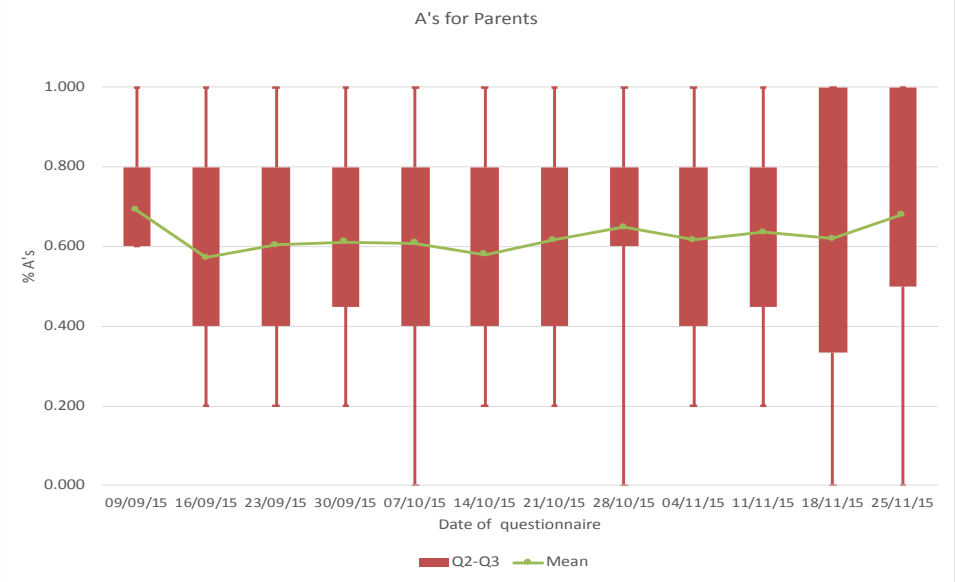


Figure 3. Interquartile Values on Average for the A's of Parents and Adolescents

If we compare the values of A's for the parent and the adolescent questionnaire by questionnaire with a Mann-Whitney test, we obtain the values shown in Table 4.

We note a statistically significative difference between first and second questionnaire, while afterwards the behavior follows a similar evolution. It seems from Figure 2 that the adolescents have a higher "reactivity" during the first two sessions with a larger change with respect to the questionnaire 0. This difference seems to "recover" toward the third session and the rest of answers to the questionnaires seem to be statistically compatible.

Table 4. Comparison with Mann-Whitney Test of the Percentage of A's for the 50 Questions between Parents and Adolescents in the 12 Questionnaires. The red Cells Indicate Values of $p \leq 0.05$, which Indicates a Statistically Significative Difference.

A Parents vs Adolescents	
Questionnaire	p
Q00	0.52
Q01	0.03
Q02	0.04
Q03	0.18
Q04	0.86
Q05	0.28
Q06	0.86
Q07	0.66
Q08	0.19
Q09	0.81
Q10	0.26
Q11	0.98

Comparing with a Friedmann test the values of the A's in the 50 answers and the 12 questionnaires for the adolescents we obtain a value of $p = 0.01$ and for the parents $p = 0.03$. We have then performed a post-hoc Conover test (Conover and Iman, 1979; Conover 1999) tests between adjacent questionnaires, see Table 5. By comparing the trend of the A's (most chosen picture in Q00) in the adolescents and parents groups, we note a statistical significant decrease between the questionnaire 0 (before the start of the groups) and the first group.

Table 5. Conover post-hoc test between successive questionnaires

A		
	Parents	Adolescents
Q00 vs Q01	0.00	0.00
Q01 vs Q02	0.04	0.47
Q02 vs Q03	0.61	0.55
Q03 vs Q04	0.90	0.04
Q04 vs Q05	0.05	0.00
Q05 vs Q06	0.05	0.02
Q06 vs Q07	0.02	0.00
Q07 vs Q08	0.03	0.93
Q08 vs Q09	0.16	0.70
Q09 vs Q10	0.52	0.24
Q10 vs Q11	0.01	0.57

The following pattern of change between parents and adolescents does not show a great commonality. We also have a significant difference between the first and second questionnaire for the parents. Other significant difference happens between questionnaires Q03, Q04, Q05, Q06 and Q07 for the adolescents, and between Q04, Q05 and Q06, Q07, Q08 and Q10, Q11 for the parents. We note however that from the 5th group, adolescents no longer participate in an acceptable number, A's choices remain around 62%. In the group of parents at the end of the cycle of the therapeutic groups the values of A return to the values of the questionnaire 0.

Evolution of the Transitions between Questionnaires

In the following we analyze the evolution of the transitions between questionnaires. We will indicate with Tnn (nn=00, 01,… ,10) the transition between Qnn and Qnn+1. We start with the transitions A→B and B→A.

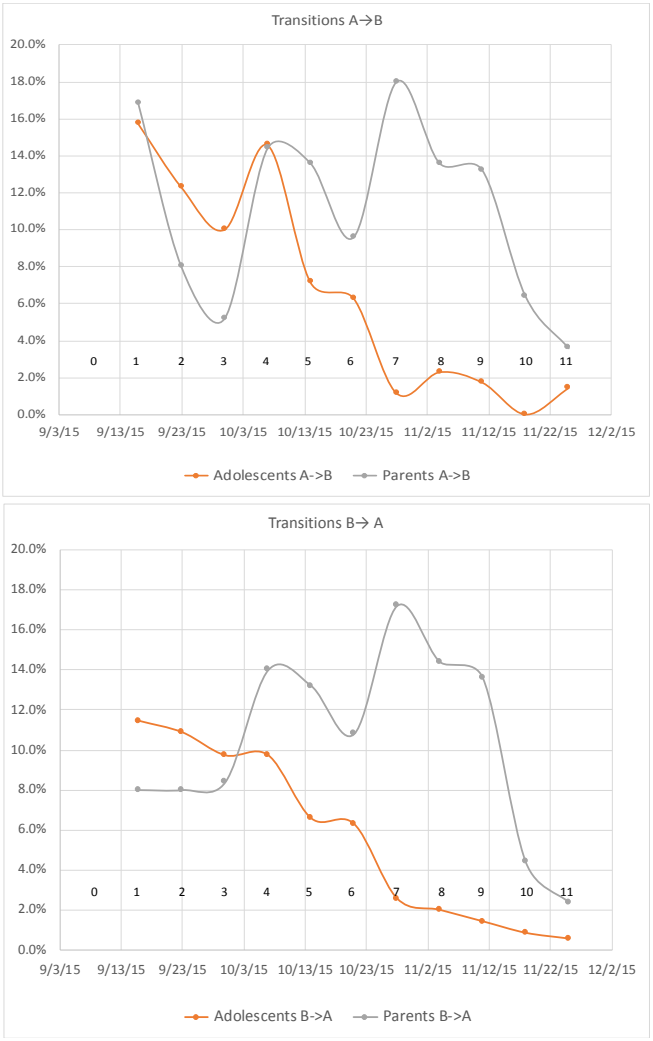


Figure 4. Transitions between the most chosen picture in Q00(A) and the other (B) along the questionnaires

As previously we compare the percentage of transitions between the parents and the adolescents for the 12 questionnaires (11) transitions (see Figure 4 and Table 6).

Table 6. Comparison with Mann-Whitney test between the percentages of transitions A→B and B→A for the 50 questions between parents and adolescents for the 12 questionnaires. Tnn (nn=00, … 10) indicates the transition between Qnn and Qnn+1. The red cells indicate values of $p \leq 0.05$, which indicates a statistically significative difference

Parents vs Adolescents		
	A→B	B→A
T00	0.72	0.11
T01	0.13	0.38
T02	0.03	0.27
T03	0.88	0.05
T04	0.01	0.00
T05	0.10	0.02
T06	0.00	0.00
T07	0.00	0.00
T08	0.00	0.00
T09	0.00	0.01
T10	0.26	0.21

For the choice changes A→B between the two groups the differences statistically significative are between Q02 and Q03, Q04 and Q05, and between Q06 and Q07, Q07 and Q08, Q08 and Q09, Q09 and Q10. For choice changes B→A between the two groups, the statistically significant differences are between Q03 and Q04, Q04 and Q05, Q05 and Q06 and between Q06 and Q07, Q07 and Q08, Q08 and Q09, Q09 and Q10.

Here there is a stark difference in the pattern of transitions between parents and adolescents particularly in the second part of the test. It has to be noted, again, that the number of adolescents participating to the last groups is very low, reducing the significance of the comparisons.

We note that differences for choice changes A→B and B→A are similar in both groups with significant differences between Q06 and Q07, Q07 and Q08, Q08 and Q09, Q09 and Q10.

If we consider the total number of transitions A→B and B→A, we have 22 (2 x 11) series of 50 percentages of A's, for parents and adolescents. The value of the Friedmann test for this table is 0.00 for the adolescents and for the parents, so we have performed a Conover posthoc tests with the results reported Table 7.

Table 7. Comparison of the percentages of transition A→B **VS** B→A with the Conover post-hoc test in each questionnaire for parents and adolescents. Tnn (nn=00, ... 10) indicates the transition between Qnn and Qnn+1.

	A→B vs B→A	
	Parents	Adolescents
T00	0.00	0.00
T01	0.96	0.40
T02	0.14	0.59
T03	0.81	0.00
T04	0.92	0.93
T05	0.38	0.68
T06	0.66	0.09
T07	0.52	0.75
T08	0.71	0.70
T09	0.16	0.32
T10	0.47	0.34

Both in the parents and the adolescents, we note a strong difference in the "flux" A↔B between the pre-group questionnaire Q00 and the questionnaire Q01. This is consistent with the remarks of the previous section and it will be further examined below. Another statistically significative difference is also present between Q03 and Q04 for the adolescents.

As in the previous section we compare the percentages of the successive transitions A→B and B→A for the 12 questionnaires (11 transitions and therefore 10 comparisons). The Friedmann test is 0.00 for both cases, so we performed a Conover post-hoc test between successive transitions (see Table 8).

Table 8. Comparison of the percentage of transitions A→B and B→A between successive transitions with Conover post-hoc test. Cells in red indicate statistically significant differences. Tnn (nn=00, ... 10) indicates the transition between Qnn and Qnn+1.

	A→B		B→A	
	Parents	Adolescents	Parents	Adolescents
T00 vs T01	0.00	0.00	0.78	0.59
T01 vs T02	0.01	0.48	0.84	0.89
T02 vs T03	0.00	0.00	0.00	0.82
T03 vs T04	0.91	0.00	0.75	0.00
T04 vs T05	0.00	0.08	0.07	0.32
T05 vs T06	0.00	0.00	0.00	0.00
T06 vs T07	0.07	0.07	0.00	0.30
T07 vs T08	0.20	0.34	0.88	0.32
T08 vs T09	0.00	0.01	0.00	0.37
T09 vs T10	0.00	0.02	0.03	0.72

As it can be seen in Table 8, the change of choice from A→B is statistically significant practically everywhere in the two groups, except between Q01 and Q02, Q04 and Q05, Q07 and Q08 for the adolescents and Q03 and Q04, Q06 and Q07, Q07 and Q08 for the parents.

The change B→A is statistically significative between Q03 and Q04, Q05 and Q06 for the group of adolescents. For parents between Q02 and Q03, Q04 and Q05, Q05 and Q06, Q06 and Q07, Q08 and Q09, Q09 and Q10.

Evolution of Flux and Focalisation

We now consider two related quantities that help us better characterize the change in the response along the various questionnaires. We will call *flux* the sum of the transitions A→B + B→A. This quantity expresses the total "activity" of the members of the group in changing their choices between questionnaires. We will call *focalisation* the difference between transitions B→A - A→B. This quantity expresses the direction of the change of choices. If positive, it means an increase in the

choice of A's, while if negative it indicates a defocusing away from the initial choice. These two quantities are shown in Figure 5.

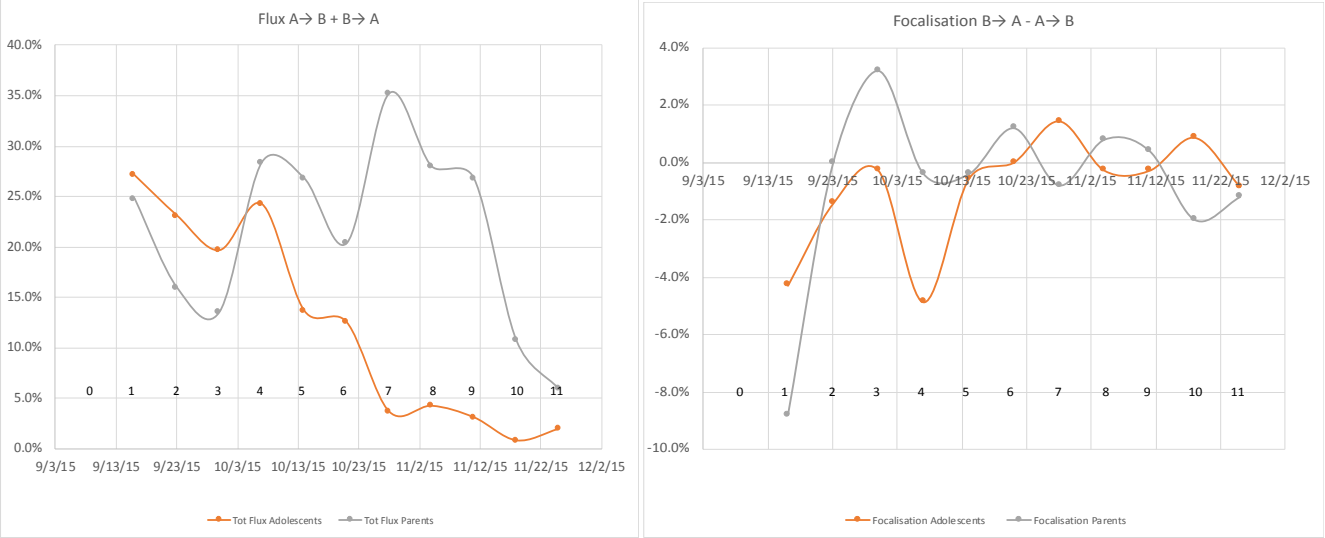


Figure 5. Comparison of the Flux and Focalisation (see text) for Adolescents and Parents

We consider now the differences between parents and adolescents in these two quantities that are shown in Table 9.

Table 9. Comparison with Mann-Whitney test of the percentage of transitions A→B + B→A (flux) and B→A - A→B (focalization) for the 50 questions between parents and adolescents for the 12 questionnaires. Tnn (nn=00, ..., 10) indicates the transition between Qnn and Qnn+1. The red cells indicate values of $p \leq 0.05$, which indicates a statistically significative difference.

Parents vs Adolescents		
	A→B + B→A	B→A - A→B
T00	0.39	0.25
T01	0.12	0.67
T02	0.04	0.47
T03	0.41	0.24
T04	0.00	0.88
T05	0.00	0.77
T06	0.00	0.91
T07	0.00	0.90
T08	0.00	0.81
T09	0.00	0.17
T10	0.05	0.85

The total flow is statistically different between the two groups between Q02 and Q03, Q04 and Q05, Q05 and Q06, Q06 and Q07, Q07 and Q08, Q08 and Q09, Q09 and Q10. It is at the limit of significance the difference between Q10 and Q11. There are no differences between the two groups regarding the focalisation between the different passages. We notice a difference in the choice of A at the beginning of the therapy, between the two groups. The differences in the changes in choices between A→B and B→A between groups are numerous but particularly starting from Q05, that is when the group of adolescents is depleted.

The flow is very different between adolescents and parents while the focalisation has no significant differences. There are large differences in the flux, but the tendency to choose the alternative response to the initial one in Q00 is present in both groups.

The Friedmann test for the flux in both the adolescents and the parents is highly significative (p = 0). Therefore, we have performed a Conover post-hoc test shown in Table 10.

Table 10. Comparison of the percentages of flux with the Conover post-hoc test for each questionnaire for parents and adolescents. Tnn (nn=00, ... 10) indicates the transition between Qnn and Qnn+1.

	Flux A→B + B→A	
	Parents	Adolescents
T00 vs T01	0.00	0.00
T01 vs T02	0.49	0.18
T02 vs T03	0.00	0.00
T03 vs T04	0.00	0.00
T04 vs T05	0.02	0.00
T05 vs T06	0.00	0.00
T06 vs T07	0.31	0.00
T07 vs T08	0.03	0.07
T08 vs T09	0.00	0.02
T09 vs T10	0.00	0.50

The flux of changes from A ↔ B shows statistical significance between Q00 and Q01, and between Q02, Q03, Q04, Q05 and Q06, in the groups of adolescents and parents. There is a statistical significance between Q06 and Q07, Q08 and Q09 as well as between Q08 and Q09 for adolescents and between Q07, Q08, Q09 and Q10 for the parent group

We now analyze the focusing of the responses, that is the quantity B→A - A→B that can be seen in

Figure 5. The Friedmann test for the parents has a *p* value of 0.67 and for the adolescents of 0.21. We have performed a Conover post-hoc test among successive questionnaires and the results can be seen in Table 11.

Table 11. Comparison of the percentages of focalisation with the Conover post-hoc test for each questionnaire for parents and adolescents. Tnn (nn=00, ... 10) indicates the transition between Qnn and Qnn+1.

	Focalisation B→A - A→B	
	Parents	Adolescents
T00 vs T01	0.00	0.01
T01 vs T02	0.07	0.57
T02 vs T03	0.21	0.00
T03 vs T04	0.81	0.00
T04 vs T05	0.71	0.50
T05 vs T06	0.76	0.39
T06 vs T07	0.95	0.15
T07 vs T08	0.95	0.88
T08 vs T09	0.22	0.29
T09 vs T10	0.58	0.16

The focalisation around the initial choice shows statistically significant changes between T00 and T01 in the two groups. For the adolescents are also statistically significant changes between T02 and T03, and between T03 and T04. The initial choice (A) decreases with a tendency to go from 73% to 68% for adolescents and from 68% to 56% for parents between the pre-group questionnaire 0 and the first group questionnaire 1. The decrease is greater among standing parents, but it continues significantly in the adolescents group.

The tendency is to move from the initial choice to the alternative one in the two groups, and this is more pronounced in the group of parents, up to the 5th questionnaire. We note again that, after the 5th questionnaire, the adolescents group has a very reduced attendance, and therefore we should take with care the indication of a focusing effect (increase of A's) after the 5th questionnaire in this group.

Although the changes in the choices from A→B and B→A are important and the comparison of the flows A→B vs B→A was significant between Q00 and Q01 and between Q03 and Q04 in the adolescents.

The total flow is important and the differences between different questionnaires are statistically significative for both groups. The focalisation on A decreases significantly from T00 to T01 and shows subsequently fluctuations, but with significance only in the adolescent group for T02 vs T03, and T03 vs T04.

Discussion

The problem of measure is central also in psychophysics because the unconscious is, by definition, unknowledgeable and this not only because it is "unconscious", but also because the "detector" is the cognitive part of the individual and it is deeply influenced and built by the unconscious. For the moment the only way to study the unconscious is to observe its amplification in group dynamics.

This analogy relies on the observation that group dynamics, as described by the "basic assumptions", is similar to individual dynamics, in particular in the crucial aspect of the analogy of the mourning process in the individual with the loss of the ideal leader in the group.

Considering the presence of a number of individuals potentially connected, we have made the hypothesis that the entanglement effects could be more pronounced in case of a group setting. We call this "quantum amplification".

According to Jung, "the amplification is the extension and the deepening of a dream-like image by means of associations centered on the dream theme and parallels based upon social studies and history of symbols (mythology, mysticism, folklore, religion, ethnology, art, etc.). Thanks to this the dream becomes accessible to interpretation" (Jung, 1962).

In quantum physics, during a measurement, a microscopic process is "amplified" to be observed macroscopically. It is only after such an irreversible act of amplification that a microscopic quantum process can be observed as a physical phenomenon. If we consider the analogy conveyed by the term "amplification" in both contexts, unconscious mental processes like dreams can be considered, as "microscopic" quantum processes, becoming accessible to conscience only via an amplification / measurement process, in this case operated by consciousness. This is one more example of the interesting parallels that can be drawn between quantum physics and psychodynamic.

The most striking aspect is that the answers to Q00 are very skewed, with values around 70% for the choice of A and there is a sharp drop to values around 60% for Q01. In previous studies the orientation was around 70% in Q01 with fluctuations between 60% and 70% during the group experience (Trojaola Zapirain *et al.*, 2019). The time between one data collection and the other in the current study is one week and was about a month for the previous study on the OMIE training.

It seems that the group dynamics more than orienting, confuses and makes more casual the choices toward a sort of "groupal continuum", leading to the formation of a single groupal entity correlating the members of the group.

The difference between Q00 and Q01 is statistically significative in all cases A, A→B, flow difference between A→B and B→A, flow and focussing, except for case B→A and this both in the adolescents and parents group. The reaction to joining the group is therefore a decrease in the orientation of the initial choice.

The differences in the flows of the choices A→B and B→A and the total flow show different trends between the two groups, especially starting from Q04, that is, from the moment when the group of adolescents loses participants. The focus on the initial choice does not show statistically significative differences in the two groups, it would therefore seem that it is above all the entity of the movement away from the initial choice that differentiates the two groups.

The phenomenon of exchange and circulation among the participants can be related with a lessening of the neurotic complexes and therefore a recovery of the psychic energy that is blocked there. On the other hand, the ensuing feeling of loss of control can be distressing and anxiogenic and perhaps explains the dropouts of the adolescent participants just when the choice of A's is at a minimum. This could be interpreted as a typical reaction of resistance to change. Adolescents are still not very individualized and therefore very sensitive to *clan* loyalties towards the "peer / friend community" which is replacing the family community and any departure from the clan rule is experienced in a conflictual and highly anxiogenic way.

Considering the change of choice from A to B for the groups of parents and parents, we note that for Bilbao I and II the change is statistically significant between Q03 and Q04 (see Figure 6 taken from Trojaola Zapirain *et al.,* 2019)

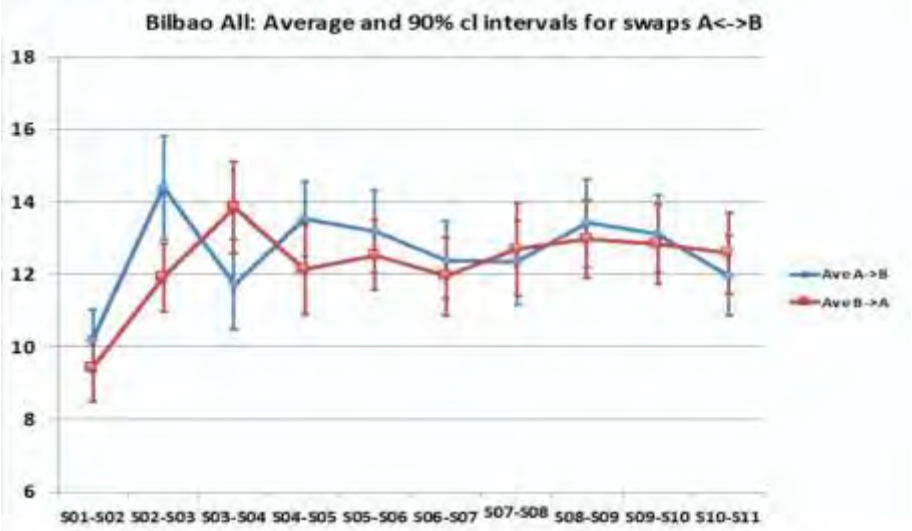


Figure 6. Average number of transitions with 90% confidence intervals (ordinates) observed between consecutive data collections (abscissae) for the transitions from pictures A to B and for the transitions from pictures B to A (from Trojaola Zapirain *et al.,* 2019).

Conclusions

The difficulty of verifying any theory about the unconscious is that we have no way to perform a direct measurement (Cerf & Adami, 1997, 1998; Atmanspacher, 2006). To avoid this problem, we have devised an indirect measure based on a questionnaire to be answered by the participants in a group situation. This experiment has been conducted in the year 2009-2010 at the OMIE[1] group training for therapists which is part of the postgraduate curriculum for psychologists at the University of Deusto (Bilbao, Spain). The analysis of the data of this experiment has been reported in four publications (Trojaola-Zapirain *et al.* 2014, 2015, 2016, 2019). The main conclusion of the study was that the data were suggesting evidence in favor of the building of a group unconscious in accordance with Bion's "basic assumptions", where a strong interaction between the psyches of the group participants is established at the very beginning of the group experience, and then it slowly evolves in accordance with the known group dynamics. To describe this phenomenon, Bion has introduced the concept of "valency", indicating the

[1]Osasun mentalaren ikerketarako ezarkundea Basque Foundation for the Investigation of Mental Health

immediacy of the onset of the basic assumptions, more analogous to tropisms than to purposive behaviour. This effect is enhanced in the group setting by an amplification process whereby groups "amplify emotional reactions, resulting in a combustible process of emotional contagion" (Bion, 1961, p. 54).

As we said above, the interpersonal relations in the group situation may have a relaxing effect on the neurotic attitudes with a consequent recovery of otherwise non-accessible psychical energy. Otherwise, particularly for adolescents, the feeling of identity loss could bring stress and anxiety and ultimately provoke the exit from the group, when the "orientation" (A's choices) is minimal and the *confusion* is highest. Psychoanalytically we would call this a resistance to change. Incomplete individuation and *clanic* loyalties, common in adolescents when moving from the family-envelope to the friends one may create a strong discomfort and therefore lead to a flight from the group situation.

The more *casual* (or less focused) answers to the questionnaire could indicate a phenomenon of "groupal continuum", coming from the *entanglement* of individuals psyches toward the formation of a *groupal unity* having its own identity. It is interesting to note that such an experiment is actually trying to determine whether a psychic situation – the supposed entanglement of the individuals' unconscious in a group situation – has an actual effect on the material world – the answers provided to a questionnaire. In this sense, such an experience has the ambition to breach the duality mind – matter and to offer a possible window into the supposed holistic *Unus Mundus* (Atmanspacher & Fach, 2013; Dorn, 1602).

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