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Diminished emotional expression in schizophrenia: An interdisciplinary approach based on behavioral interventions

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Abstract

Background: Negative symptoms represent the main cause of disability in schizophrenia, having recently been grouped into two general dimensions: avolition and diminished emotional expression, which includes affective flattening and alogia. The aim of this study was to explore the response of these two symptoms to a set of behavioral interventions based on contingency management, performed in an interdisciplinary context. **Method:** Behaviors of interest were monitored and evaluations before and after the treatment were performed on 9 schizophrenic inpatients with persistent negative symptoms. The program included 12 group double sessions aimed at developing facial expression and verbal communication, and a nursing care plan to generalize and strengthen these behaviors synergistically. **Results:** There were appreciable differences in facial expression, which were less clear for alogia. The clinical evaluation using PANSS-N did not find notable differences at group level, but the nursing assessment using NOC indicators did. **Conclusions:** Although difficult to modify, negative symptoms are not insensitive to the influence of behavioral interventions. Specific psychological interventions that address negative symptoms as a priority focus of attention and care need to be promoted and developed, particularly when considering the crucial role of context in their progression.

Keywords: Schizophrenia, negative symptoms, behavioral interventions.

Resumen

Expresión emocional disminuida en la esquizofrenia: un abordaje interdisciplinar basado en intervenciones conductuales. **Antecedentes:** los síntomas negativos representan la principal causa de discapacidad en la esquizofrenia, habiendo sido agrupados recientemente en dos dimensiones: avolición y expresión emocional disminuida, que incluye el aplanamiento afectivo y la alogia. El objetivo del estudio fue explorar la respuesta de estos dos síntomas a un conjunto de intervenciones conductuales basadas en el manejo de contingencias en un contexto interdisciplinario. **Método:** se monitorizaron conductas de interés y realizaron medidas pre y post a 9 participantes con esquizofrenia negativa persistente ingresados en dispositivos de rehabilitación. El programa incluyó 12 sesiones grupales dobles dirigidas a trabajar la expresión facial y la comunicación verbal, y un plan de cuidados para fortalecer y generalizar estas conductas. **Resultados:** se obtuvieron diferencias relevantes en la expresión facial, que fueron menos claras para la alogia. La evaluación clínica mediante la PANSS-N no obtuvo diferencias notables a nivel de grupo, pero sí la valoración mediante indicadores NOC. **Conclusiones:** aunque difíciles de modificar, los síntomas negativos no son insensibles a la influencia de intervenciones conductuales. Resulta necesario potenciar intervenciones psicológicas específicas que aborden estos síntomas como un foco prioritario de atención y cuidado, considerando el papel crucial del contexto en su evolución.

Palabras clave: esquizofrenia, síntomas negativos, intervenciones conductuales.

Negative syndrome is the main cause of functional impairment in schizophrenia, being present in up to 10-30% of patients (Buchanan, 2007). Negative symptoms have a profound impact on long-term outcomes (Hunter & Barry, 2012), and also on lifestyle and general health (Fonseca-Pedrero, 2018; García-Portilla & Bobes, 2013). Furthermore, negative symptoms cause the greater weight on concerns of families as caregivers (North, Pollio, Sachar, Hong, Isenberg, & Bufe, 1998). According to the Diagnostic and Statistical Manual of Mental Disorders –Fifth edition- (DSM-5) (American Psychiatric Association, 2013), two negative symptoms are particularly prominent: diminished emotional expression (DEE) and avolition. While avolition represents a decrease in motivated self-initiated purposeful activities, DEE is a general dimension that includes alogia and affective flattening. Alogia is an important restriction of spontaneous language; the subject shows poverty of speech and does not provide sufficient information. Affective flattening is characterized by an unchanging expression and a marked reduction in body gestures at the service of communication, as well as the absence of vocal inflections or variations in tone or volume that allow for the emphasis in parts of speech (APA, 2013). It is important to understand the function of emotional expression in communication in social contexts, because the expression of emotions, both verbal and

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non-verbal, allows a person to establish and adapt interpersonal relationships, promoting the creation and maintenance of a social support network. In this sense, DEE could drastically reduce communication with others, worsening social isolation, mainly because the approach of people will depend largely on the facial expression of the person one approaches.

Negative symptoms describe a loss of more or less complex behaviors that were present in the past. In this sense, it is interesting to remember Skinner, who said that the most important thing about a psychotic person "is not what he is doing but what he is not doing" (Skinner, 1979, p. 27), noting that the essential problem is how to build up the behavior which is missing. A radically functional view of negative symptoms consists in understanding these symptoms directly as behaviors and not as signs of an underlying illness. It is difficult to find another more pragmatic explanation for promoting an encouraging approach than understanding negative symptoms in terms of their relation with the context, generally characterized by its poverty, low stimulation and loss of roles, audience and reinforcement. We assume that behavior cannot be understood outside the context (Dougher & Hayes, 1999), because behavior is defined in terms of the consequences in the environment, which in turn, influences behavior. Our ability to influence behavior depends on our ability to alter the environment that affects the person, and in order to take effective action to influence behavior, we must alter some aspect of the context of the action (Biglan & Hayes, 2016). This is crucial to increase the level of functioning in negative symptoms through psychological approaches as, for example, behavioral activation (Mairs, Lovell, Campbell, & Keeley, 2011). According to Skinner´s concept of verbal behavior (Skinner, 1981), we can understand different "symptoms" grouped in DEE as members of the same functional response class at the service of communication. A class of responses is a set of behaviors which share the same functions, even when they take different topographies. Even some negative symptoms that we would most tipically understand as being non-verbal are, at least in part, functionally verbal. The essence of this matter is that changes in context affect the future probability of all responses of the same class; what affects one response, also affects others of the same functional class that appear in similar circumstances. Thus, negative symptoms under the construct of DEE could be seen mainly as the consequences of a process of extinction generalized to the entire functional class of responses due to lack of reinforcement in the user's personal history. The loss of reinforcement is a crucial aspect in psychosis, and it was already observed in 1952 by Peplau "the mother of psychiatric nursing", noting that inpatients come to give up when they reach the solution of all problems permanently forgoing behaviors aimed at achieving objectives (Peplau, 1991).

Classically, it was considered that negative syndrome had an irreversible prognosis and that structural brain disorders could be the underlying phenomenon (Crow, 1980). Although negative symptoms represent the main difficulties in schizophrenia, most psychological treatments have focused on positive symptoms (Elis, Caponigro, & Kring, 2013). However, despite refractoriness to antipsychotic treatment of negative symptoms (Leucht, Corves, Arbter, Engel, Li, & Davis, 2009) and the pessimism that surrounds them, different psychological approaches have shown some effectiveness, as Cognitive Behavioral Therapy (Rector, Seeman, & Segal, 2003), Cognitive Remediation Therapy (Gharaeipour & Scott, 2012) and Integrated Psychological Therapy (Roder, Mueller, & Schmidt, 2011). Moreover, art therapies, generally in a group-based approach, are also effective in reducing negative symptoms in both inpatient and outpatient populations (National Institute for Health and Care Excellence, 2014). In line with this, it is necessary to design and test more psychological interventions that are easy to perform, affordable, and assumable by staff. This recovered emphasis in psychological therapies is related to the dissatisfaction with standard, medication-based care, and the growing evidence of its viability and efficacy (Vallina, Pérez, Fernández, Soto, Perona, & García, 2014). The aim of this work was to evaluate the impact of a behavioral intervention based on contingency management in a clinical interdisciplinary context. For this aim, we have designed and tested an original training and reinforcement program in two 24h mental health devices in which we could maximize the environmental control, due to the continuous care. These devices represent an appropriate context for this kind of interventions, and allow the participation of all the staff members of Public Mental Health Services, also in the evaluation of results. In this sense the figure of the "case manager" is very important. This is an individual who spends long periods of time with the user, sharing experiences in the community, observing multiple aspects of every day functioning in a privileged way. This is important because the problems involved in the assessment of functional impairment in schizophrenia can be surmounted in part through the use of appropriate informants of everyday functioning (Harvey, 2013).

This work was a realistic approach for negative symptoms in schizophrenia, focusing on DEE, and it was based on a radically functional perspective of these symptoms. The study was carried out by the usual care staff of public mental health services, showing the effects on DEE by means of complementary evaluations, according to an interdisciplinary context.

Method

Participants

The participants were 9 schizophrenic inpatients (6 men and 3 women) users of two public Psychiatric Mental Health devices in Oviedo (Spain). The mean age was 36.3 (SD = 9.8; range: 23-49). All participants completed the study. Inclusion criteria were: diagnosis of schizophrenia (DSM criteria), to be inpatient in an uninterrupted attention device, prevalence of persistent negative symptoms (score of at least 18 on the PANSS negative subscale), and clinical stability. Exclusion criteria were: attendance below 75% of treatment sessions and severe active psychopathology. Four participants had a diagnosis of schizophrenia for over 20 years. As general sociodemographic characteristics, 6 had primary education and 3 secondary education; all of them were single, childless, and also receiving a sickness pension. Their current family relationships were distant or non-existent, providing poor social support.

Staff collaborators: 2 medical doctors specializing in psychiatry with more than 20 years of experience, and 16 nurses (12 of them specializing in mental health). Two nurses had less than 2 years of experience, and the rest had from 15 to 25 years of experience in severe mental illness. The psychiatrists would usually have a weekly interview with every participant in order to follow-up on the clinical evolution. The interaction with the nursing staff was very high, including multiple situations of daily life, 24 hours a day, 7 days a week.

Instruments

The instruments used were: the PANSS-N (Kay, Opler, & Fiszbein, 1987), Spanish version (Peralta & Cuesta, 1994), a simple behavioral check-list created ad hoc, and a nursing assessment based on the Nursing Outcomes Classification (NOC) (Moorhead, 2013).

The PANSS-N contains 7 negative symptoms including lack of spontaneity and flow of conversation, blunted affect and poor rapport, in a scale from 1 (absent) to 7 (extreme) depending on its severity. This scale establishes definitions and scoring criteria to evaluate the severity through standard questions. The overall score is obtained by adding the scores for each item. The psychometric properties of PANSS-N are adequate: the inter-observer reliability is .80, and the internal consistency .92, also showing a high criterion validity (r = 0.81) (Peralta & Cuesta, 1994). Each participant was evaluated by their psychiatrist using the PANSS-N before and after the impact. The elapsed time between both assessments was 12 weeks.

The check-list used included 5 behavioral categories carefully chosen and operationally defined: smile (excluding unmotivated or inappropriate laughter), lack of facial expression, presence of speech output (excluding soliloquy), look at the environment and social interaction. The observers must record the presence or absence of the behavior described as a dichotomous decision, according to the procedure established. Successive pre- and post-treatment observations were performed throughout two periods of 4 weeks immediately before and after the introduction of the program.

The nursing assessment consisted of 5 NOC indicators (Moorhead, 2013) related with the following target symptoms: Use of spoken language, Use of non-verbal language, Ability to express emotions, Socialized expressions of feelings, and Lack of pleasure in activities. Items have a Likert format with five response options ranging from 1 (never demonstrated) to 5 (consistently demonstrated). Each participant was assessed by their assigned mental health nurse (case manager) before and after the impact, the same week that the PANSS-N was performed.

Procedure

Once approved by the Research Ethics Committee of the Principality of Asturias and obtained the corresponding authorizations, the collaborators carried out the pretest by using the subscale PANSS-N and NOC items, while usual treatment and care were ongoing. Complementarily, before and after the program was introduced, several observation days were planned taking into account the availability of observers, to score the occurrence over time of the target behaviors in every participant. The observation intervals were selected according to criteria such as ease of performance, no interference with ongoing assistance and warranty of the ecological validity of the observation process. The inter-observer reliability of all checklist categories was previously calculated by the kappa index.

Table 1
Checklist: percentages of agreement and Kappa coefficients

Behavioral categories	% agreement	Kappa
Smile	94	0.88
Lack of FE	82	0.64
Speech Output	96	0.92
Look at environment	90	0.80
Social Interaction	86	0.72

The chosen observation places were the dining room and the nursing office, in order to maximize the probability of observing some of the target behaviors, assuming the inactivity that characterizes negative schizophrenia. The record was made by using a procedure aimed to ensure the equivalence of the observations (pre/post), according with a systematic sampling of these situations in both periods. The observation interval was one full minute at the start of the activity (eating and taking medication). The collaborators were trained in the task and equipped with a device of countdown that warned them of the interval finalization. In the planned days, each participant received 4 observations. Changes on medication were carefully monitored, including the introduction, withdrawal or modification of dose.

The behavioral intervention had two components. On one hand, 12 double group session´s introducing activities specifically aimed to strengthen behaviors whose absence is characteristic in DEE. On the other hand, a complementary mental health nursing care plan was introduced to generalize and strengthen synergistically the behaviors worked in the sessions.

The intervention program was conducted by the first researcher throughout 12 sessions over 4 consecutive weeks, at 3 weekly sessions. Every session was made up of two 30 minutes parts, with a rest period of 20 minutes in-between them. The first part was aimed to strengthen verbal communication and the second to enhance facial expression (FE) by interactive exercises of increasing difficulty. The sessions were carried out in a multipurpose room, allowing a face to face interaction. The exercises of the first part were: reading and repeating sentences of increasing length, phrases to complete, game of questions and answers, building sentences from single words, describing images, request set, guided conversation and free conversation. The second part exercises were: recognition of FE, imitation of FE by modeling, exaggeration of FE, production of FE with verbal instructions (without modeling), and intentional production of FE with congruent verbal messages. The operant procedures used were: shaping, modeling, executing feedback, positive reinforcement, verbal instruction, guided practice, and assigning graded tasks. The activity was supported by using printed cards, cartoons and photographs. Each session started with a brief review of the previous session´s exercises and ended by encouraging patients to perform the behaviors with which they had been working, assigning them tasks such as: “look at the face of the one who speaks to you” or “smile to others and see what happens”. The researcher introduced a simple and clear communication style in the context of a relationship of radical collaboration and acceptance, with the aim of establishing an effective engagement.

Complementarily, a nursing care plan was introduced to create new contingencies in daily life. This plan included activities such as: reinforcing any spontaneous verbal communication or facial expression corresponding to them congruently, showing themselves accessible and permanently available as audience, encouraging progressive interaction with others, asking open questions or simple requests in moments of prolonged inactivity, encouraging the client to identify recreational activities and reinforcing their participation in them, etc. (McCloskey & Bulechek, 2002, p. 592). All interventions were carried out in such

a way as to avoid overstimulation, and adapted to a tolerable level, given the defensive character of negative symptoms against the positive symptoms (Lemos, Fonseca, Paino, & Vallina, 2015).

Data analysis

The analysis was carried out using Bayesian inference. Differences in post- and pre means were estimated using normal models from non-informative prior distributions. Posterior distributions of mean differences were summarized by the mean and 95% Credible Interval (95% CI). This is the equivalent in Bayesian inference to the Confidence Interval of classical inference, but it has the advantage of being able to be interpreted directly in probabilistic terms, that is to say, it is the interval in which the true parameter is found with a probability of 95%. Posterior probabilities of differences greater than zero are also presented. The analysis was performed with the statistical package R 3.3.2 and the Markov Chain Monte Carlo simulations (MCMC) with the JAGS package.

Results

Results are showed separately; checklist, PANSS-N and NOC. As table 2 shows the behaviors "smile" and "lack of FE" showed relevant differences pre/post, which are less clear for "speech output". However, the categories "look at the environment" and "social interaction" did not show differences.

As table 3 shows we did not find relevant differences pre/post for the clinical assessment by using the PANSS-N. However, the results support the existence of relevant changes pre/post with the NOC indicators. In the items "Use of spoken language", "Use of non-verbal language" and "Socialized expression of feelings", data show an important increase in the score because the posterior probability that the difference is greater than zero is greater than 90%. This increase is not so conclusive with "Ability to express emotions" and even less with "Lack of pleasure in activities".

Discussion

The aim of this work was to explore the response of some behaviors related with DEE to a set of psychological interventions based on contingency management in an interdisciplinary mental health context. On one hand, behaviors related with affective flattening showed relevant changes in the checklist and also in NOC items, showing an improvement in the expression of feelings. On the other hand, changes in those behaviors related with alogia were reflected in NOC scores, being less clear in the checklist. We interpret these results as signs that support the effectiveness of the intervention program. Our findings suggest that these behaviors experimented discrete changes, and this is relevant because it shows the importance of the context as a crucial factor related to their occurrence and maintenance, defying the classic postulate of the irreversible prognosis of negative symptoms (Crow, 1980). These data are consistent with a radically functional view of negative symptoms and suggest signs of encouraging results on the modification of target behaviors, especially considering the short duration of this pilot study. However, although 3 participants showed an important increase in their PANSS-N score, no relevant differences pre/post for the clinical assessment were found at group level, and this result introduces the question of whether modifying discrete behaviors is a clinically relevant fact. Modifying discrete behavior may lack clinical relevance, but it has psychological meaning, because it confirms a radically functional approach to behavior, that is, the reciprocal influence between behavior and consequences.

The present study was carried out with a small convenience sample, whose availability has conditioned the intervention and the choice of design. It is basically a single-group pre-experiment, which limits generalization of the results due to its important methodological limitations, such as lack of a control group and absence of random assignment. However, data obtained by using the checklist permit, in an N = 1 perspective, providing a better control to certain threats, because each participant acts as their own control. Unfortunately, we had a small amount of data for several patients, and a greater number of repeated measures would have been desirable, especially in the post-treatment period. The availability of observers and the limited duration of the study established to avoid loss of subjects, due to the small sample, did not make it possible. Furthermore, the long-term effects of the intervention are lacking, and we cannot be sure that findings are solely attributed to the intervention introduced. For this reason, the current results should be considered as preliminary, and the interpretation of present data very cautious. In mental health care contexts, effectiveness studies can rarely be performed in optimal conditions. In addition, the measurement of improvements in patient status after intervention is not easy, because a small concomitant enhancement in depressive symptoms may lead to confound the interpretation of improvement on negative symptom

Table 2
Pre-post differences in behavioral categories assesed by the check-list

Behavioral categories	Posterior mean of difference of means	95% credibility interval	Posterior probability of difference > 0 (%)
Smile	0.99	0.29 to 1.69	99
Lack of FE	-1.22	-1.91 to -0.48	0.3
Speech output	0.74	0.004 to 0.98	98
Look at environment	0.41	-0.12 to 0.96	93
Social interaction	0.20	-0.30 to 0.70	80

Table 3
Pre-post differences in PANSS-N and NOC items

	Posterior mean of difference of means	95% credibility interval	Posterior probability of difference > 0 (%)
PANS-N	-4.39	-11.15 to 2.24	9.5
NOC ítems:			
Use of spoken language	0.79	0.015 to 1.56	97.7
Use of non verbal language	1.11	0.25 to 1.98	99.2
Ability to express emotions	0.45	-0.64 to 1.57	79.9
Socialized expression of feelings	0.67	-0.36 to 1.69	90.9
Lack of pleasure in activities	-0.44	-1.31 to 0.49	15.2

scales (Arango, Buchanan, Kirkpatrick, & Carpenter, 2004). For the clinical assessment we used the PANSS-N (Kay et al., 1987), a first generation instrument widely used in our context, instead of new construction tools as CAINS (Horan, Kring, Gur, Reise, & Blanchard, 2011). Our psychiatrists had an extensive experience in the use of PANSS, and there is evidence to suggest that older scales are more associated with expressive deficits such as blunted affect and alogia (Horan et al., 2011). In this study, psychiatrists were blind but mental health nurses were not, and this source of error could affect the scores, especially by using NOC, because the case managers knew the therapeutic objectives.

A strange variable of special relevance was the psychopharmacological treatment, although we assumed the refractoriness of negative symptoms to antipsychotic medication (Leuch et al., 2009). Four participants received prescription changes during the study, but only one of the 3 participants with more improvement on the PANSS-N had changes in medication.

The inpatients were involved here in a stimulant context of change where new contingences had been introduced by the staff. In the group sessions, we observed that some participants who initially showed no emotional modulation in the smile shaped, began to present it in the context of the social reinforcement received from others (an initial "cold" smile was replaced by a "spontaneous" smile, with emotional content). This supports the idea of using natural reinforces in therapy whenever possible, and it links with the essence of the therapeutic relationship, something especially relevant in schizophrenia, when what is involved, from a phenomenological point of view, is to give meaning to the experiences in a biographical and recovery context (Pérez-Álvarez & García-Montes, 2012). The high attendance of the group sessions we obtained (89.8%) is interpreted here as a remarkable achievement related to a well-established therapeutic relationship.

This intervention program has been put into practice in a rehabilitation context in which available contingencies and instructed or molded rules that regulate behaviors were already present, including both situations observed, and it conditions the capacity of generalization of behaviors entrained to other contexts. Further, it would have been desirable to study the effectiveness of the social attention provided by the nursing staff as a reinforcement in more detail, as this potential reinforcement may have been different depending on the participant and the professional who applied it at a given moment.

Negative symptoms should be a priority focus of attention and care in schizophrenia, but their improvement could not be enough. Thus, the important thing is the recovery process, the ability to develop social relationships, to achieve meaningful goals and, in short, to live a life that is worth living (Andresen, Oades, & Caputi, 2011). So, in a long-term perspective, it is crucial to guarantee the users possibility to organize their life and participate in those decisions that affect them, introducing changes to reduce the lack of control over environmental events but also helping to find and clarify the horizons of life around personal values (Pérez-Álvarez & García-Montes, 2012).

The results obtained have a high ecological validity, which is reflected in the different individual conditions of the participants, the usual context of the activity (public mental health services) and in the fact that the interventions were carried out by the usual care staff of the participants. We must emphasize the feasibility of applying this kind of interventions; easy to perform and with a cost practically insignificant in the mental health context.

Despite its important limitations, this study provides new support to fight some notions widely accepted in psychiatry, as the environmental insensitivity of negative symptoms, in coherency with previous research that showed the efficacy of some psychological interventions on negative symptoms. This points to the increasing recognition of contextual interventions in the interdisciplinary treatment and management of serious mental illnesses as schizophrenia, but more evidence is needed.

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To Dr. Montejo, in memoriam.

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