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The impact of thought disorder on therapeutic alliance and personal recovery in schizophrenia and schizoaffective disorder: An exploratory study

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ABSTRACT

Thought and language disorders are a main feature of schizophrenia. The aim of the study is to explore the impact of thought disorder on therapeutic alliance and personal recovery because of its interference with verbal communication. Thought disorder, positive and negative symptoms (Positive and Negative Syndrome Scale), functioning (Modified Global Assessment of Functioning scale), insight (Scale to Assess Unawareness of Mental Disorder), attachment insecurity (Psychosis Attachment Measure), therapeutic alliance (Scale to Assess the Therapeutic Relationship), and personal recovery (Recovery Assessment Scale (RAS), Integration Sealing-Over Scale) were assessed in 133 outpatients with schizophrenia or schizoaffective disorder at baseline and twelve months later. The data were analyzed by hierarchical multiple linear regression. Higher levels of thought disorder were significantly associated with lower clinicians' ratings, but not with patients' ratings of therapeutic alliance. In addition, lower clinicians' ratings of therapeutic alliance were significantly linked to a more sealing over and less integrative recovery style. In fact, the lower therapeutic alliance ratings mediated the association between thought disorder and a sealing over recovery style. The results highlight the importance of considering thought disorder in treatment of schizophrenia and schizoaffective disorder which may interfere with therapeutic alliance and treatment efforts towards recovery.

Keywords: psychosis, formal thought disorder, cognitive disorganization, speech disorder, therapeutic relationship.

1. Introduction

Formal thought disorder is a multifaceted construct that encompasses a diverse set of thinking disturbances and manifests as a speech disorder. It reflects disorganized thoughts in terms of processes as opposed to content (Beck et al., 2011a) and can be distinguished in objective (e.g. derailment) and subjective positive forms (e.g. pressure / rush of thought) as well as in objective (e.g. poverty of speech) and subjective negative forms (e.g. inhibited thinking; Kircher and colleagues, 2014). Thought disorder has been considered to be a core feature of schizophrenia (Bleuler, 1950) and described either as part of the positive syndrome or as part of the disorganization syndrome, based on factor analyses of the symptoms of schizophrenia (Beck et al., 2011a). It occurs in about 50% of patients with schizophrenia and 60% of patients with schizoaffective disorder, but is not pathognomonic of schizophrenia spectrum disorders and can be also observed in patients with mania or depression (Roche et al., 2015). Thought disorder predicted psychosis transition of young people at-risk mental state (Katsura et al., 2014) and was also found among relatives of patients with schizophrenia (Manschreck et al., 2012). It is moderately stable (trait marker; Wilcox et al., 2012) but becomes exacerbated during the acute episode, tends to increase in severity with illness duration (Maeda et al., 2007), and may also persist during antipsychotic treatment (Remberk et al., 2012). Thought disorder can be as disabling as the other symptoms of schizophrenia, limiting social and occupational functioning (Tirupati et al., 2004) as well as wellbeing and life satisfaction (Sigaudo et al., 2014; Tan et al., 2014). Furthermore, it may impede the access to many effective psychological treatments of schizophrenia (e.g. cognitive behavioral or narrative therapies), because it heavily interferes with the verbal communication in the process of therapy. Consequently, thought disorder is probably among the least explored and treated symptoms of schizophrenia in psychotherapy (Beck et al., 2011a). Efforts have thus been taken to elucidate the neurobiological basis of thought disorder (Horn et al., 2009, 2010, 2012) which might allow for the use of recently developed treatment approaches such as noninvasive brain stimulation that has proven useful in other domains of schizophrenia (Homan et al., 2011, 2012).

Therapeutic alliance has a crucial impact on therapy outcome, beyond therapeutic methods (Orlinsky et al., 2004), and this is also true for the treatment of schizophrenia (Farrelly et al., 2014; Priebe et al., 2011). Recently, Goldsmith and colleagues (2015) demonstrated that therapeutic alliance has a causal effect on symptomatic outcome of a psychological treatment for people with a first or second episode of a non-affective psychosis, and that poor therapeutic alliance is actively detrimental. So far, positive and negative symptoms, lack of insight, attitude towards treatment or medication, social functioning, or attachment insecurity have been studied as impediments for developing an effective therapeutic bond with psychotic patients (Barrowclough et al., 2010; Gumley et al., 2014; Jung et al., 2014; Wittorf et al., 2009). In contrast, knowledge about the impact of thought disorder on therapeutic alliance is sparse. Because verbal communication is one of the main means for therapists

to build relationship with patients (Cruz and Pincus, 2002), thought disorder may reflect a crucial obstacle in therapy.

Recovery from schizophrenia has been defined in various ways (Cavelti et al., 2012b). Traditionally, recovery was understood as sustained symptom remission, accompanied by functional rehabilitation (e.g. cognitive, social, and vocational) and reduced use of medical health services. For this scientific definition of recovery, the term “clinical recovery” was introduced (Bellack, 2006). During the last years, another definition of recovery emerged from individuals who had personally experienced severe mental illness (SMI) and had used mental health services (e.g. Ben-David et al., 2014; Frese et al., 2009; Helman 2014). From consumers’ perspective, recovery refers to a personal process of overcoming the negative personal and social consequences of having a severe mental disorder and regaining a self-determined and meaningful life, beyond symptom remission and functional rehabilitation (Bellack, 2006). Thus, recovery is no longer seen as an event occurring solely within the individual, but as a dynamic interplay between the individual and its environment (Cavelti et al., 2012b). In this article, we will refer to the latter definition of recovery as “personal recovery” (Slade et al., 2012). Personal recovery which involves reconstructing illness episodes in life-narratives, finding meaning in psychotic experiences, and overcoming (self-) stigma may rely strongly on metacognitive and communicative abilities (Hasson-Ohayon et al., 2014; Salvatore et al., 2012). Even if it is easily conceivable that thought disorder impedes personal recovery, empirical data thereto is lacking.

As part of a larger investigation of predictors of service engagement with community mental health services among people with schizophrenia or schizoaffective disorder (Beck et al., 2011b; Cavelti et al., 2012a; Cavelti et al., 2014; Kvrđic et al., 2013), the current study aimed to explore a) the impact of thought disorder on therapeutic alliance, b) the impact of thought disorder and therapeutic alliance on personal recovery, and c) whether therapeutic alliance mediates the association between thought disorder and personal recovery. Thereby, we controlled for the influence of established predictors of therapeutic alliance and personal recovery, such as positive and negative symptoms, functioning, insight, and attachment style.

2. Methods

2.1. Participants and procedure

Between February 2009 and March 2010 consumers of community mental health services in the region of Basel, Switzerland, between 18 and 65 years of age and diagnosed with schizophrenia or schizoaffective disorder were asked for study participation. Diagnoses were confirmed by the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders - IV Axis I Disorders (First et al., 1996). Exclusion criteria were a primary diagnosis of alcohol or substance dependency, an organic syndrome or learning disability, inadequate command of German, and homelessness. After a full explanation of the study aims and procedures, participants provided written informed consent. The assessment consisted of an interview (PANSS, MGAF, SUMD) conducted by

three well trained research psychologists as well as of questionnaires for participants (PAM, STAR-P, RAS) and their therapists (STAR-C, ISOS), administered at baseline (t_b) and at 12-month follow-up (t_f). Participants received a financial compensation of 40 Swiss Francs for the baseline and of 60 Swiss Francs for the follow-up assessment. The study was approved by the local ethics committee.

2.2. Measures

Severity of symptoms common in schizophrenia was assessed by the *Positive and Negative Syndrome Scale* (PANSS; Kay et al., 1987). This semi-structured interview consists of 30 items which are rated on a 7-point Likert scale (“1=absent”, “7=extreme”). Several factor analytical studies have suggested that a five-factor model better captures PANSS structure than the original three factors proposed by Kay et al. (1987). Based on five-factor models reported in the literature, Wallwork et al. (2012) constructed a “consensus” model that might enhance comparability between studies. For our statistical analyses, we used the Positive, Negative, and Disorganized/Concrete subscales (Excited and Depressed excluded). Disorganized/Concrete encompasses the items P2 (conceptual disorganization), N5 (difficulty in abstract thinking), and G11 (poor attention), and was applied as an indicator of thought disorder in this study. Especially P2 and N5 are in line with the concept of FTD and have been found to positively correlate with the Thought, Language, and Communication (TLC) scale (Horn et al., 2010; 2012).

The *Modified Global Assessment of Functioning* scale (M-GAF; Hall, 1995) was used as an overall measure of psychological, social, and occupation functioning, covering the range from positive mental health to severe psychopathology. A single score is rated ranging from 1-90, with higher scores indicating a higher level of global functioning. The MGAF is intended to be a generic rather than a diagnosis-specific scoring system. However, it has been proved a valid measure of how patients with schizophrenia are doing (Schwartz, 2007).

The three global items of the semi-structured interview *Scale to assess Unawareness of Mental Disorder* (SUMD; Amador et al., 1993) were used to evaluate patient’s awareness of having a mental disorder, of achieved effects of medication, and of social consequences of having a mental disorder. These dimensions of insight were rated on a 5-point Likert scale (1=“aware” to 5=“unaware”), with higher scores indicating poorer awareness.

The attachment style was measured by the *Psychosis Attachment Measure* (PAM; Berry et al., 2006). This self-rating scale was developed to assess insecure attachment in adults with psychosis. It includes 16 items that are rated on a 5-point Likert scale from 0=“strongly disagree” to 4=“strongly agree”. A high overall total score reflects a pronounced insecure attachment style.

The *Scale to Assess the Therapeutic Relationship-Patient Version* (STAR-P) and *Clinician Version* (STAR-C; McGuire-Snieckus et al., 2007) was applied to measure therapeutic alliance in community psychiatry. Each version consists of 12 items, rated on a 5-point Likert scale, with 0=“never” to 4=“always”. Higher total scores indicate better therapeutic alliance.

Several aspects of personal recovery were assessed: The *Recovery Assessment Scale* (RAS; Corrigan et al., 2004) measures subjective experience of the recovery process, including the extent to which people are living a satisfying, fulfilling, and hopeful life and developing meaning and purpose regardless of the presence of mental symptoms. The RAS is plausibly the most commonly used recovery measure in research and have been favoured by narrative reviews about recovery measures (Salzer and Brusilovskiy, 2014). It is a self-report measure which consists of 41 items that are rated on a 5-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). A factor analysis resulted in five factors, totalling 24 items: Personal Confidence and Hope, Willingness to ask for Help, Goal and Success Orientation, Reliance on Others, and Not Dominated by Symptoms. In addition, the *Integration Sealing-Over Scale* (ISOS; McGlashan, 1987) was used by clinicians to evaluate their patient’s prevailing recovery style. The recovery style reflects the various coping strategies people use when dealing with psychosis and reflects psychological adjustment to the mental disorder. Patients with an integrative recovery style are described a “patients who are more likely to see their psychotic experience as something that is a part of them and has arisen from their life context, as something that they are responsible for, and as something that may be used as a source of information about themselves and their conflicts, relationships, and behaviour” (Staring et al., 2014, p. 295). Conversely, patients with a sealing over recovery style “tend to distance themselves from their psychotic experiences, viewing them as causally independent, globally negative interruptions to their lives” (Staring et al., 2014, p. 295). The ISOS comprises of 13 opposite statements related to both recovery styles. In deviation from the original recommendation to derive a global rating score, each of the individual items was evaluated separately on a 6-point scale (1=“integration” to 6=“sealing over”, as proposed by Modestin et al. (2004). The higher the total score, the more pronounced is the tendency towards sealing over.

2.3. Statistical analyses

All statistical analyses were conducted based on 133 complete data sets, using IBM SPSS Statistics 22. For a flowchart of the study and a comparison between participants who completed the study and those who dropped out, please see Cavelti et al. (2014).

Hierarchical multiple linear regression analyses were used to test the associations between thought disorder, therapeutic alliance and personal recovery. Blocks of predictors were entered stepwise. The contribution of each block to the explained outcome variance was examined by testing the difference in F -scores on significance ($\Delta F, P$). If the block did not significantly contribute to the amount of explained outcome variance, the coefficients were not further interpreted (Frazier et al., 2004).

To test the impact of thought disorder on therapeutic alliance, two separate analyses were conducted with STAR-C and STAR-P at follow-up, respectively, as criterion variable. The first block of predictors included STAR-C or -P at baseline to control for baseline differences in therapeutic alliance. The second block comprised the baseline scores of established predictors of therapeutic

alliance, i.e. attachment style (PAM), insight (SUMD), functioning (MGAF), as well as positive and negative symptoms (PANSS Positive, PANSS Negative). The third block considered the predictor of special interest, i.e. the thought disorder score at baseline (PANSS Disorganized/Concrete).

To test the impact of thought disorder and therapeutic alliance on personal recovery, separate analyses were conducted with the ISOS total score and the RAS subscales at follow-up as criterion variables. The first block of predictors included the ISOS or the RAS subscale, respectively, at baseline to control for baseline differences in recovery style or subjective experiences of recovery. The second block comprised the baseline score of global functioning (MGAF) and symptoms (PANSS Positive, PANSS Negative, PANSS Disorganized/Concrete). The third block considered therapeutic alliance at baseline, while STAR-C was used as predictor for the ISOS total score and STAR-P as predictor for the RAS subscales.

To test whether therapeutic alliance mediates the impact of thought disorder on personal recovery within the two-wave longitudinal design of the study, two paths had to be estimated: First, the path (f) from the predictor variable (thought disorder) at baseline to the mediator variable (therapeutic alliance) at follow-up while controlling for the mediator variable (therapeutic alliance) at baseline and, second, the path (g) from the mediator variable (therapeutic alliance) at baseline to the outcome variable (personal recovery) at follow-up while controlling for the outcome variable (personal recovery) at baseline. The product of the two paths ($f \cdot g$) represents an estimation of the mediation (or indirect) effect of thought disorder at baseline on personal recovery at follow-up (Cole and Maxwell, 2003). The significance of the indirect effect was tested by dividing the product of the two paths by the standard error term proposed by Kenny et al. (1998), $\sqrt{g^2sf^2 + f^2sg^2 + sf^2sg^2}$, where f and g are unstandardized regression coefficients and sf and sg are their standard errors. The mediated effect divided by its standard error yields a z -score of the mediated effect. If the z -score is greater than 1.96, the mediation effect is significant at the 0.05 level. The 95% confidence intervals around the estimate of the indirect effect were calculated by the product of the paths f and $g \pm s_{fg}z_{.975}$, where $z_{.975}$ is equal to the constant 1.96 and s_{fg} is the standard error term calculated earlier. Mediation is confirmed if the confidence interval does not include zero (Frazier et al., 2004).

3. Results

3.1. Descriptive statistics

Of the 133 completers, 47 (35.4%) were female. The mean age at study begin was 44.48 years ($SD = 11.88$). The majority lived alone ($n = 73$; 54.9%) and had neither a stable partnership (of at least three months duration, $n = 102$; 76.7%) nor children ($n = 98$; 73.7%). On average, they received 12.34 years of education ($SD = 2.98$). Most participants were unemployed (neither on the free nor on the protected market) ($n = 71$; 53.4%) and received a governmental disability annuity ($n = 100$; 75.2%). Eighty-nine participants (66.9%) were diagnosed with schizophrenia and 44 (33.1%) with schizoaffective disorder. On average, participants had been mentally ill since 18.06 years ($SD = 12.05$) and treated in the community mental health services since 6.89 years ($SD = 6.21$). The majority ($n = 128$; 96.2%)

received an antipsychotic medication, usually at least one second-generation agent ($n = 122$; 91.7%). In addition to the antipsychotic medication, twenty-two participants (16.5%) received a mood stabilizer and 44 participants (33.1%) an antidepressant.

Table 1 contains reliability scores, means and standard deviations of the variables at baseline and follow-up.

Please, insert Table 1 here.

3.2. The impact of thought disorder on therapeutic alliance

The results regarding the impact of thought disorder on therapeutic alliance are presented separately for clinicians' and patients' STAR ratings.

Higher levels of thought disorder at baseline were significantly associated with lower clinicians' ratings of therapeutic alliance twelve months later. In contrast, positive and negative symptoms, functioning, insight and attachment style at baseline did not have a significant impact on clinicians' estimates of therapeutic alliance at follow-up (see Table 2, part 1).

We found no significant influence of neither thought disorder, nor positive and negative symptoms, functioning, insight, or attachment style at baseline on patients' ratings of therapeutic alliance at follow up (see Table 2, part 2).

Please, insert Table 2 here.

3.3. The impact of thought disorder and therapeutic alliance on personal recovery

The results regarding the impact of thought disorder and therapeutic alliance on personal recovery are presented separately for clinicians' (ISOS) and patients' (RAS) ratings of personal recovery.

Higher levels of thought disorder, negative symptoms, and functioning, and lower clinicians' ratings of therapeutic alliance at baseline were significantly associated with a more sealing-over and less integrative recovery style twelve months later. In contrast, there was no significant impact of positive symptoms at baseline on the recovery style at follow-up (see Table 3, part 1).

With regard to patients' ratings of personal recovery, a better therapeutic alliance at baseline was significantly linked to a higher willingness to ask for help at follow-up, while neither symptoms (positive, negative, thought disorder) nor global functioning had an impact on willingness to ask for help (see Table 3, part 2). However, we found no significant associations between thought disorder or therapeutic alliance with feeling of not being dominated by symptoms (thought disorder: $B(SE) = 0.02(0.08)$, $\beta = 0.02$, $p = 0.793$; therapeutic alliance: $B(SE) = 0.05(0.03)$, $\beta = 0.16$, $p = 0.052$; $R^2 = 0.29$, $F(6,126) = 8.50$, $p = 0.001$), personal confidence and hope (thought disorder: $B(SE) = -0.14(0.17)$, $\beta = 0.07$, $p = 0.413$; therapeutic alliance: $B(SE) = 0.07(0.06)$, $\beta = 0.09$, $p = 0.287$; $R^2 = 0.39$, $F(6,126) = 13.29$, $p = 0.001$), goal and success orientation (thought disorder: $B(SE) = -$

0.01(0.10), $\beta = -0.01$, $p = 0.946$; therapeutic alliance: $B(SE) = -0.01(0.04)$, $\beta = -0.03$, $p = 0.686$; $R^2 = 0.36$, $F(6,126) = 11.92$, $p = 0.001$), or reliance on others (thought disorder: $B(SE) = 0.01(0.09)$, $\beta = 0.01$, $p = 0.968$; therapeutic alliance: $B(SE) = 0.05(0.03)$, $\beta = 0.12$, $p = 0.148$; $R^2 = 0.32$, $F(6,126) = 9.67$, $p = 0.001$).

Please, insert Table 3 here.

3.4. Therapeutic alliance as mediator between thought disorder and personal recovery

The question whether therapeutic alliance mediates the association between thought disorder and personal recovery was tested based on clinicians' ratings of therapeutic alliance and of patients' recovery style, because thought disorder failed to significantly impact patients' ratings of therapeutic alliance (see 3.1.) which is a precondition for mediation.

Higher levels of thought disorder at baseline were significantly associated with lower clinicians' ratings of therapeutic alliance at follow-up ($B(SE) = -0.45(0.15)$, $\beta = -0.23$., $p = 0.004$, $R^2 = 0.22$, $F(2,130) = 17.80$, $p = 0.001$). Additionally, lower clinicians' ratings of therapeutic alliance at baseline predicted a more sealing over and less integrative recovery style at follow-up ($B(SE) = -0.05(0.02)$, $\beta = -0.25$., $p = 0.002$, $R^2 = 0.25$, $F(2,130) = 21.57$, $p = 0.001$). Finally, the indirect effect from thought disorder to recovery style was also significant (z -score = 2.08 > 1.96, 95% CI[0.04, 0.001]), confirming therapeutic alliance as a mediator between thought disorder and a recovery style of sealing over.

4. Discussion

4.1. Discussion of the results

The purpose of the current study was to examine the associations between thought disorder, therapeutic alliance and personal recovery using a regression analytical approach. We found that higher levels of thought disorder at baseline predicted lower clinicians' ratings of therapeutic alliance at follow-up, independently of positive and negative symptoms, functioning, insight, and attachment style. Empirical data on the impact of formal thought disorder on therapeutic alliance in treatment of psychosis is rare, making it difficult to compare our results with previous studies. In a qualitative study on the factors differentiating patients who progress or failed to progress in cognitive-behavioural therapy for psychosis, McGowan and colleagues (2005) reported that therapists were concerned with the importance of patients' "clear and logical thinking" in making progress in therapy and questioned their ability to help patients with illogical thinking. The authors did not report symptoms, such as thought disorder, of their study participants. However, illogicality has been described as a hallmark of formal thought disorder (Andreasen, 1979). Thus, our results may indicate that thought disorder, such as illogicality, may contribute to a feeling of confusion in clinicians; they may question the ability to bond with the patient as well as to jointly define and reach therapeutic goals, resulting in lower ratings of the therapeutic alliance. By contrast, we found no associations between thought disorder at baseline

and patients' ratings of therapeutic alliance at follow-up. This result may be explained by the fact that patients' awareness of thought disorder is generally weak (Barrera et al., 2009). In addition, other factors than thought disorder, such as patients' perceived therapist genuineness and competence (Jung et al., 2015) or attitude to treatment (Barrowclough et al., 2010), may be more important predictors of patients' estimates of therapeutic alliance.

We found higher levels of thought disorder at baseline to be linked to a more sealing over and less integrative recovery style at follow-up. This is in line with a recent study that reported higher symptom levels of cognitive disorganization on the PANSS for the sealed-over group (Bell et al., 2005). Maybe that thought disorder interferes with the patients' ability to "understand the psychotic experience and to establish continuity of his or her mental activity and personality from before the psychotic experience, during psychosis, and through recovery" (Modestin et al. 2004, p. 1). In our study, higher levels of negative symptoms and higher levels of functioning at baseline predicted also a sealing over recovery style at follow-up. In contrast, in the study by Modestin and colleagues (2009) a tendency towards sealing over correlated positively with the PANSS negative symptom scale, but negatively with the MGAF. The association between a sealing over recovery style and higher MGAF scores found in our study may indicate that when functioning improves, individuals become more aware of the extent to which psychosis impaired role functioning in the past, motivating sealing-over. This interpretation is supported by evidence suggesting that patients who seal over are those who see greater loss and shame in their psychosis, motivating denial (Staring et al., 2014; Tait et al., 2003). In our study no significant association was found between thought disorder and patients' subjective experiences of recovery as measured by the RAS subscales. However, this result is consistent with the broad consumer literature espousing that personal recovery is possible even in the presence of disabling symptoms (Cavelti et al., 2012b; Salzer and Brusilovskiy, 2014).

Lower clinicians' ratings of therapeutic alliance at baseline were linked to a more sealing over and less integrative recovery style at follow-up. Furthermore, therapeutic alliance was found to mediate the adverse association between thought disorder and a recovery style of sealing over. Recent results indicate that recovery styles can change over time (Thompson et al., 2003) and can be modified by psychotherapeutic interventions (Jackson et al., 1998). Considering the importance of therapeutic alliance for treatment outcome (e.g. Goldsmith et al., 2015), our results may denote that thought disorder can interfere with therapeutic alliance, which, in turn, can hamper treatment efforts to facilitate patients' psychological adjustment to psychosis. Yet, this interpretation needs to be addressed cautiously because we examined the influence of therapeutic alliance on recovery style and not on outcome (i.e. symptom remission or functional improvement) per se. However, our interpretation is supported by evidence suggesting that an integrative recovery style in patients with schizophrenia spectrum disorders predicts higher rates of symptom remission (Staring et al., 2014; Thompson et al., 2003) and functioning (McGlashan, 1987; Modestin et al., 2009; Thompson et al., 2003).

Finally, higher patients' ratings of therapeutic alliance at baseline predicted a greater willingness to ask for help at follow-up, but showed no associations with the other RAS subscales at follow-up. Recently, Moran and colleagues (2014) reported a significant positive correlation between working alliance and all subscales of the RAS in a cross-sectional study on 72 people with serious mental illness, including schizophrenia, schizoaffective, bipolar, and/or depressive disorders. Moreover, a positive bidirectional relationship between working alliance and recovery (assessed by the RAS) was found in a longitudinal study examining 61 people with psychotic spectrum illnesses (Hicks et al., 2012), indicating that improvement in therapeutic alliance positively influences gains in recovery and that gains in recovery also facilitate stronger therapeutic alliance. Thus, our finding adds to the growing evidence about the significance of the therapeutic alliance in treatment of psychosis (Farrelly et al., 2014; Goldsmith et al., 2015; Priebe et al., 2011) and is align with the broader field of psychotherapy research which emphasizes the value of the therapeutic relationship across various types of psychological problems and mental disorders (Orlinsky et al., 2004).

4.2. Limitations and conclusion

The study had some shortcomings which are important to consider: First, thought disorder was assessed by a general psychopathology scale (Wallwork et al., 2012) and not a symptom specific measure, such as the Thought, Language, and Communication (TLC) scale (Andreasen, 1979) or the Thought and Language Disorder (TALD) scale (Kircher et al., 2014). However, the PANSS Disorganization/Concrete subscale has been successfully used in other empirical studies investigating thought and language disorder in patients with psychosis (e.g. Herzig et al., 2015). Second, the measure used to assess role functioning mixes aspects of psychopathology and socio-occupational functioning. Third, due to the oversampling of male participants in our study, the exclusion of patients with a comorbid diagnosis of alcohol or drug abuse from study participation, and the rather small sample size for the complexity of multivariate analyses, the results have to be replicated on larger, more representative samples. Fourth, even if comparable to other studies, the explained outcome variance was moderate, raising the question of other crucial predictors of therapeutic alliance and personal recovery. For example, metacognition has been described as a significant predictor of personal recovery (Lysaker and Dimaggio, 2014). In this regard, it is interesting to note that cognitive disorganization symptoms demonstrated inverse associations with metacognitive abilities (Hamm et al., 2012). Another neglected predictor of therapeutic alliance in this study may be depression. However, evidence regarding the link between depression and therapeutic alliance in treatment of psychosis is inconsistent with some studies reporting a significant association between higher depression scores and lower therapeutic alliance ratings (Barrowclough et al., 2010; Mulligan et al., 2014), while other studies failed to found a significant association (Jung et al., 2014; Kvrjic et al., 2013). Fifth, both the therapeutic alliance and the recovery style were rated by clinicians. Thus, we cannot fully rule out the possibility that the significant association found between lower ratings of therapeutic alliance at baseline and a sealing over recovery style at follow-up is a methodological

artefact. Sixth, causal interpretations of our correlational study results are not appropriate and we did not examine opposite or bi-directional relationships between variables (e.g. personal recovery may also influence therapeutic alliance; e.g. Hicks et al., 2012; Kvrjic et al., 2013). Finally, while our study focused specifically on personal recovery as outcome, future studies may investigate the impact of thought disorder on aspects of clinical recovery, such as symptom remission and functional improvement.

Despite these limitations, the current explorative study provided first evidence for a negative impact of formal thought disorder on clinicians' ratings of therapeutic alliance and the patients' recovery style in outpatients with schizophrenia or schizoaffective disorders. We did not find evidence for an influence of thought disorder on patients' ratings of therapeutic alliance and personal recovery as assessed by the RAS. However, this does not imply evidence for the absence of such an effect, the testing of which would require a different study design and most probably a larger study sample. Given that so far patients with thought disorder have been regularly excluded from therapy studies (Beck et al., 2011a) and that therapeutic alliance is one of the most important predictors of treatment outcome in psychosis (Farrelly et al., 2014; Goldsmith et al., 2015; Priebe et al., 2011), our results highlight the need for future research about how clinicians can deal with thought disordered patients in therapy in order to best support their recovery process.

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Acknowledgement

We are grateful to all participants.

Funding

This work was supported by the Swiss National Science Foundation (grant number: 105314-120673 to Roland Vauth).

Contributors

RV and MC designed the study and were involved in data acquisition and management. MC analyzed and interpreted the data and wrote the first draft and the revision of the manuscript. MC, RV, and PH contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

Table 1. Cronbach's alpha coefficients (α), means (M) and standard deviations (SD) of variables at baseline (t_b) and follow-up (t_f)

Variable	Range	α_{t_b}	M_{t_b} (SD_{t_b})	α_{t_f}	M_{t_f} (SD_{t_f})
PANSS Positive	4-28	0.78	8.03 (4.01)	0.67	7.12 (3.21)
PANSS Negative	6-42	0.82	11.21 (4.82)	0.84	11.25 (5.03)
PANSS Disorganized/Concrete	3-18	0.67	7.30 (2.86)	0.64	7.40 (2.67)
PAM	0-48	0.69	19.96 (6.7)	0.74	18.93 (7.22)
SUMD, Mental Disorder ^a	1-5	-	1.98 (1.41)	-	1.95 (1.38)
SUMD, Medication ^a	1-5	-	1.74 (1.25)	-	1.73 (1.18)
SUMD, Social Consequences ^a	1-5	-	2.05 (1.48)	-	2.05 (1.45)
MGAF	1-90	-	50.35 (10.46)	-	50.73 (9.44)
STAR-C	0-48	0.72	38.10 (6.40)	0.75	37.76 (5.59)
STAR-P	0-48	0.64	37.55 (7.79)	0.66	37.45 (6.96)
ISOS ^{b/c}	1-6	-	3.34 (1.61)	-	3.22 (1.28)
RAS Personal Confidence and Hope	9-45	0.81	32.95 (6.31)	0.80	33.61 (5.96)
RAS Willingness to Ask for Help	3-15	0.87	12.25 (2.54)	0.73	12.27 (2.32)
RAS Goal and Success Orientation	5-25	0.56	19.14 (3.30)	0.64	19.55 (3.46)
RAS Reliance on Others	4-20	0.60	15.38 (2.92)	0.63	15.40 (3.05)
RAS Not Dominated by Symptoms	3-15	0.65	10.62 (2.70)	0.67	10.77 (2.76)

Notes. ISOS = Integration Sealing-Over Scale, MGAF = Modified Global Assessment of Functioning, PAM = Psychosis Attachment Measure, PANSS = Positive And Negative Syndrome Scale, RAS = Recovery Assessment Scale, STAR-C/P = Scale to Assess Therapeutic Relationship Clinician Version / Patient Version, SUMD = Scale to assess Unawareness of Mental Disorder. Higher scores indicate higher levels of the variable, if not otherwise specified.

^a reversed scored; higher scores indicate lower levels of insight

^b higher scores indicate more sealing over and less integration

^c modal value

Table 2. Predicting therapeutic alliance at one year follow-up: Results from hierarchical multiple linear regression analyses

Outcome	Predictors	B (SE)	β	<i>t</i> (df)	<i>p</i>	<i>R</i> ²	<i>F</i> (df)	<i>p</i>
STAR-C <i>t</i> _f	STAR-C <i>t</i> _b	0.31 (0.07)	0.35	4.22 (122)	0.001	0.24	4.23 (9,123)	0.001
	PAM <i>t</i> _b	-0.05 (0.07)	-0.07	-0.71 (122)	0.482			
	SUMD, Mental Disorder ^a <i>t</i> _b	-0.02 (0.46)	-0.01	-0.04 (122)	0.969			
	SUMD, Medication ^a <i>t</i> _b	-0.42 (0.52)	-0.10	-0.82 (122)	0.413			
	SUMD, Social Consequences ^a <i>t</i> _b	0.08 (0.43)	0.02	0.19 (122)	0.848			
	MGAF <i>t</i> _b	-0.01 (0.06)	-0.02	-0.16 (122)	0.874			
	PANSS Positive <i>t</i> _b	0.02 (0.13)	0.01	0.12 (122)	0.903			
	PANSS Negative <i>t</i> _b	-0.13 (0.10)	-0.11	-1.27 (122)	0.207			
	PANSS Disorganized/Concrete <i>t</i> _b	-0.41 (0.18)	-0.21	-2.23 (122)	0.028			
STAR-P <i>t</i> _f	STAR-P <i>t</i> _b	0.46 (0.07)	0.51	6.42 (122)	0.001	0.31	6.13 (9,123)	0.001
	PAM <i>t</i> _b	0.04 (0.08)	0.03	0.43 (122)	0.667			
	SUMD, Mental Disorder ^a <i>t</i> _b	-1.02 (0.55)	-0.21	-1.90 (122)	0.065			
	SUMD, Medication ^a <i>t</i> _b	0.12 (0.61)	0.02	0.21 (122)	0.838			
	SUMD, Social Consequences ^a <i>t</i> _b	0.04 (0.51)	0.01	0.08 (122)	0.935			
	MGAF <i>t</i> _b	-0.01 (0.07)	-0.02	-0.21 (122)	0.837			
	PANSS Positive <i>t</i> _b	-0.16 (0.16)	-0.09	-0.98 (122)	0.328			
	PANSS Negative <i>t</i> _b	-0.02 (0.12)	-0.01	-0.15 (122)	0.880			
	PANSS Disorganized/Concrete <i>t</i> _b	0.11 (0.22)	0.05	0.52 (122)	0.607			

Notes. *t*_b = baseline, *t*_f = follow-up, MGAF = Modified Global Assessment of Functioning, PAM = Psychosis Attachment Measure, PANSS = Positive And Negative Syndrome Scale, STAR-C/P = Scale to Assess Therapeutic Relationship Clinician Version / Patient Version, SUMD = Scale to assess Unawareness of Mental Disorder. Higher scores indicate higher levels of the variable, if not otherwise specified.

^areversed scored; higher scores indicate lower levels of insight

Table 3. Predicting personal recovery at one-year follow-up: Results from hierarchical multiple linear regression analyses

Outcome	Predictors	B (SE)	β	<i>t</i> (df)	<i>p</i>	<i>R</i> ²	<i>F</i> (df)	<i>p</i>
ISOS ^a t _f	ISOS ^a t _b	0.26 (0.06)	0.33	4.21 (126)	0.001	0.32	10.06 (6,126)	0.001
	MGAF t _b	0.03 (0.01)	0.25	2.50 (126)	0.014			
	PANSS Positive t _b	0.02 (0.03)	0.08	0.88 (126)	0.382			
	PANSS Negative t _b	0.06 (0.02)	0.24	0.30 (126)	0.003			
	PANSS Disorganized/Concrete t _b	0.09 (0.04)	0.19	2.27 (126)	0.025			
	STAR-C t _b	-0.05 (0.02)	-0.28	-3.46 (126)	0.001			
RAS	RAS Willingness to Ask for Help t _b	0.45 (0.08)	0.46	5.71 (126)	0.001	0.36	11.90 (6,126)	0.001
Willingness to Ask for Help t _f	MGAF t _b	-0.02 (0.02)	-0.06	-0.67 (126)	0.503			
	PANSS Positive t _b	-0.09 (0.05)	-0.15	-1.72 (126)	0.088			
	PANSS Negative t _b	-0.06 (0.04)	-0.11	-1.38 (126)	0.169			
	PANSS Disorganized/Concrete t _b	-0.04 (0.07)	-0.05	-0.61 (126)	0.542			
	STAR-C t _b	0.06 (0.03)	0.18	2.13 (126)	0.035			

Notes. t_b = baseline, t_f = follow-up, ISOS=Integration Sealing-Over Scale, MGAF = Modified Global Assessment of Functioning, PAM = Psychosis Attachment Measure, PANSS = Positive And Negative Syndrome Scale, RAS = Recovery Assessment Scale, STAR-C/P = Scale to Assess Therapeutic Relationship Clinician Version / Patient Version, SUMD = Scale to assess Unawareness of Mental Disorder. Higher scores indicate higher levels of the variable, if not otherwise specified.

^a higher scores indicate more sealing over and less integration