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Case formulation is an essential part of clinical decision making and “... aims to describe a person's presenting problems and to use theory to make explanatory inferences about causes and maintaining factors that can inform interventions” (Bieling & Kuyken, 2003, p. 53). A case formulation is thought to be more informative for a treatment decision than the classification of the client's problem (American Psychiatric Association [APA], 2000) because it takes the unique situation and characteristics of the client into account (Haynes & Williams, 2003). It is proposed as an important aid to the design of treatments and a useful tool to organize complex and at times contradictory information from a client. A study by Witteman and Koele (1999) showed that clinicians’ idiosyncratic explanations offered for client problems accounted for differences in the treatment decisions. Differences in treatment decisions found for the same client (Witteman & Kunst, 1997) might thus be explained by differences in content and quality of case formulations (De Kwaadsteniet, Hagmayer, Krol, & Witteman, 2010). In this paper we investigate two aspects of case formulation: their quality and the relation with treatment decisions, for both simple and complex problems.

Reliability, validity, and quality are important aspects of sound case formulation (cf. Bieling & Kuyken, 2003). However, agreement about the content of a case formulation is generally low for explanatory aspects (Eells, Kendjelic, & Lucas, 1998; Kuyken, Fothergill, Musa, & Chadwick, 2005) and a case formulation can be highly reliable, but still have low validity. Furthermore, it does not necessarily mean that a reliable and valid case formulation is a useful tool for treatment planning. Looking at the quality of case formulations, several models from different theoretical perspectives have been proposed prescribing what should be included in a case formulation (e.g., Curtis, Silberschatz, Sampson, & Weiss, 1994; Haynes & O’Brien, 1990; Persons & Tompkins, 2007). Though differences between these models have been reported (Eells, 2007), they also have several aspects in common. A high quality case formulation should consist of a description of the client’s overt problem(s), relevant developmental history, an explanatory mechanism linking causal and maintaining factors that explain the problem(s), coping strengths and weaknesses and guides for intervention (cf. Bieling & Kuyken, 2003; Eells, 2007; Perry, Cooper, & Michels, 1987).

In this contribution, we focus on quality, in the footsteps of among others Kuyken et al. (2005), who argue that the quality of a case formulation is important for adequate treatment planning and determining the focus of treatment. A case formulation needs to be well structured, linking client complaints and problems to hypothesized causes, and is useful for determining the type and goals of treatment (Eells, Lombart, Kendjelic, Turner, & Lucas, 2005; Kuyken et al., 2005). Exploring the causing and maintaining factors of client problems enhances the clinical utility of a case formulation (Haynes, Spain, & Oliveira, 1993). Explanatory mechanisms detailed in the case formulation can then be matched to the mechanisms of change of different treatments (Haynes & Williams, 2003). Quality of case formulation is thus important, and determined by coherence, structure, and clinical utility (cf. Eells et al., 1998; Haynes & Williams, 2003; Kuyken et al., 2005).
However, studies by Eells et al. (1998) and Kuyken et al. (2005) showed that clinicians’ case formulations mainly contained descriptions of the client’s overt symptoms and problems and that the participating clinicians insufficiently integrated this descriptive information into an explanatory mechanism. Kuyken et al. (2005) argue that incoherently structured case formulations are less likely to be of use for selecting an appropriate intervention, even though the content of these case formulations may be valid. Furthermore, in the study by Kuyken et al. (2005) less than half of the case formulations met the requirements for adequacy of case formulation. Inadequate case formulations included much irrelevant information, lacked detail, and described few links of relevant information to problematic situations. Thus far, it has not yet been established whether case formulation indeed improves treatment outcome (cf. Nelson-Gray, 2003). Studies examining the relationship between case formulation and treatment outcome have shown mixed results (Ghaderi, 2006; Schulte, Küntzel, Pepping, & Schulte-Bahrenberg, 1992).

Kuyken et al. (2005) and Godoy and Haynes (2011) state that high quality case formulations might enhance outcomes, especially with complex cases, cases with high comorbidity, or in cases with a disorder for which there are no empirically supported standard treatments. Persons and Tompkins (2007) and Haynes and Williams (2003) argue that in situations where a client does not sufficiently respond to the first choice treatment or when the client’s problems are complex, clinicians should perform a more elaborate and specific case formulation. In case of less complex client problems, for example when an empirically supported treatment is available, a case formulation could be redundant and possibly needlessly delay the start of treatment (Nelson-Gray, 2003). The use of case descriptions presenting clients with simple problems might explain the focus on descriptive information in previous studies, which could provide enough information to justify the treatment choice. Even though the importance of adequate case formulation with complex cases has been stressed by several researchers, there is a lack of empirical knowledge about the relationship between case complexity and case formulation.

In the current study, we investigate the influence of complexity of client problems on case formulation. We define case formulation as a hypothesis about the causing and maintaining mechanisms explaining the clients’ problems that is helpful for treatment planning (cf. Eells et al., 1998; Haynes & Williams, 2003; Kuyken et al., 2005). We examine whether a case description presenting a client with more complex problems leads to case formulations of higher quality than one presenting a client with less complex problems. A high quality case formulation is coherent, well structured, and has clinical utility. A coherent case formulation is specific and relevant to the client problems. A well-structured case formulation describes the relationship between different elements, such as between presenting problems and causal factors. We consider a case formulation clinically useful when the causal variables identified are modifiable (cf. Haynes et al., 1993) and when the client has the potential for change (cf. Eells et al., 1998).

We hypothesize that for the more complex case clinicians’ formulations will be of higher overall quality and that these formulations more often contain causal models, describe relationships between causal or maintaining factors (well-structured), be relevant, consistent, specific, and testable (coherent) and contain modifiable factors and positive indicators for treatment (clinical utility; cf. Eells et al., 2005; Kuyken et al., 2005). We further examine to what extent treatment decisions are actually based on explanatory mechanisms described in the case formulations, or whether other variables, such as the clinician’s theoretical background or the DSM-IV classification, are associated with treatment decisions just as well or even better. We believe that treatment decisions should be based on case formulations, rather than on the clinician’s theoretical backgrounds or the DSM-IV classifications. Explanatory mechanisms detailed in the case formulation have higher treatment utility, as these mechanisms can be matched to mechanisms of change of a particular type of treatment.

Materials and Methods

Participants

In the study, 211 psychologists participated (67% female). Most of them were recruited by email via the Dutch Institute of Psychologists (NIP) to all members of the mental health care division. Others responded to a poster displayed at six local mental health care organizations. Participants who responded to the poster were sent a paper version of the questionnaire, those responding to the email were sent a reply with a hyperlink to the web-based questionnaire (see Materials). Upon returning a completely filled in questionnaire, participants received a gift certificate of €30.

On average, the participants were 45 years old ($SD = 10.9$, range $= 23–74$), had 16.1 years of experience ($SD = 9.3$, range $= 1–44$), and worked with clients 18.5 hr per week ($SD = 6.9$, range $= 0–40$). Almost all participants (96%) were certified mental health care psychologists. Participants could indicate to which one of eight theoretical backgrounds they adhered: 35% of the participants had a cognitive-behavioral background, 31% an eclectic background, 14% a cognitive background, 9% a psychodynamic background, 5% a solution focused background, 2% a system-theoretical background, 2% a humanistic background, and 2% a behavioral background. Most participants (53%) were employed in a mental health care institute. Others had their own practice (27%), worked in a (psychiatric) hospital (8%), a forensic setting (7%), a nursing home (3%), or a rehabilitation center (2%).

Materials

We developed a questionnaire with two vignettes of female clients presenting with problems of low or high complexity. The questionnaire started with a description of the study’s
purpose: that is to investigate hypothesis generation in the diagnostic process and the role of the diagnostic process for treatment selection. The structure of the questionnaire was explained and instructions for completion were given. Then the first one of the two vignettes was presented.

The two vignettes were selected from five vignettes tested in a pilot study and differed in how common, familiar, and easy to treat (i.e., availability of an empirically supported treatment) the clients’ problems were. The two vignettes perceived as least and most complex by the participants in the pilot study were chosen. The vignettes were based on actual clients; however, any identifying information was removed or altered so that the client’s identity could not be inferred. In the least complex vignette a female client with panic complaints was presented, in the most complex vignette a female client with dissociative and depressive complaints.

The vignettes were written in a standard psychological report format with the following sections: personal information, reason for referral, client complaints, psychiatric, somatic and family history, current social context, and mental status. Possible DSM-IV classifications and explanations for the problems were left out on purpose. The length of the two vignettes was approximately equal: 1,178 words for the least complex vignette and 1,334 for the most complex. The order in which the two vignettes were presented was randomized.

After each vignette, participants were asked to select the most likely DSM-IV classification from a list of nine DSM-IV classifications (APA, 2000), to describe in their own words how they thought the client’s problems came about and to select a maximum of two from a list of 18 specific treatment methods. The classifications and treatment methods were derived from various theoretical orientations and from participants’ responses in a pilot study to open-ended questions about classification and treatment options. There was no limitation to the number of words participants could use to describe what they thought caused the client’s problems. Then participants rated the complexity of each vignette and familiarity with the problems described on a scale from 1 (= not very complex/familiar) to 10 (= highly complex/familiar).

The last part of the questionnaire consisted of questions about the participants’ personal background and job characteristics. These questions asked about gender, age, registration as a mental health care psychologist, theoretical background, work experience, setting, and average hours per week working with clients. The questionnaire ended with thanking the participants for their cooperation.

Analysis

To analyze the participants’ responses, these responses were scored in categories. First, the case formulations were coded for quality and content, see below. Second, to be able to statistically analyze the relationship between classifications and treatment decisions, the 9 classifications and 18 treatment methods were clustered into fewer categories. Clustering of classifications and treatment methods was performed after inspection of the distributions of responses across the original categories. We asked an expert (a practicing psychiatrist with over 25 years of experience) to make a categorization of the classifications and the treatment methods. The lists of classifications were different for the two vignettes, because a pilot study with open-ended questions about the classification of the clients’ problems into DSM-IV disorders resulted in different classifications for the two vignettes. The lists of treatment methods were the same.

The clustering resulted in the following three classifications for the least complex vignette:

(a) anxiety disorder (containing panic disorder with or without agoraphobia, specific phobia, and generalized anxiety disorder),
(b) depressive episode, and
(c) anxiety disorder with depressive episode (containing panic disorder with or without agoraphobia, specific phobia, and generalized anxiety disorder, all in combination with depressive episode).

Categorization resulted in the following five classifications for the most complex vignette:

(a) posttraumatic stress disorder,
(b) depressive episode,
(c) dissociative disorder (containing depersonalization disorder, dissociative identity disorder, dissociative disorder NOS),
(d) dissociative disorder with depressive episode (containing depersonalization disorder, dissociative disorder NOS, and dissociative identity disorder, all in combination with depressive episode), and
(e) posttraumatic stress disorder with depressive episode.

Categorization resulted in the following five treatment methods for both vignettes:

(a) cognitive-behavioral therapies (containing cognitive therapy, mindfulness-based cognitive therapy, behavior therapy, cognitive-behavioral therapy),
(b) psychodynamic therapies (containing psychodynamic therapy, supportive therapy),
(c) gestalt therapy,
(d) client centered therapy, and
(e) other therapies (containing creative therapy, body-oriented therapy, system therapy, family therapy, hypnosis therapy, medication, trauma therapy, problem-solving therapy, psychodrama, psycho-education).

Manipulation Check

To verify the effect of manipulating the complexity of client problems, we calculated the mean complexity ratings for both vignettes and examined the number of participants who judged the vignette we intended to be most complex as indeed the most complex vignette.
Coding Quality Case Formulations

To assess the quality of the case formulations we developed a coding schema based on the case formulation quality rating scale designed by Kuyken, Fothergill, Musa, and Chadwick (received in personal communication; see Kuyken et al., 2005) and work by Vermande (1995) and Vermande, Van den Bercken, and De Bruyn (1996). We distinguished eight quality categories:

1. Form (explanatory hypotheses were rated as a simple hypothesis, a composite hypothesis, a causal chain, or a causal model),
2. Relations between causal factors (present/absent),
3. Relevance (present/absent),
4. Consistency (present/absent),
5. Specificity (present/absent),
6. Testability (present/absent),
7. Modifiability of causal factors (explanatory hypotheses were rated as being not modifiable, indirectly modifiable, or directly modifiable), and

See Table 1 for a description and examples of the categories.

An overall measure of quality was constructed by summing the ratings for the categories form (1 for simple hypothesis, 2 for composite, 3 for causal chain, 4 for causal model), relations between causal factors (0 for absent, 1 for present), relevance (0 for absent, 1 for present), consistency (0 for absent, 1 for present), modifiability of causal factors (0 for no modifiable factors, 1 for indirect factors, 2 for direct factors), and positive indicators (0 for absent, 1 for present). The overall measure of quality could range from 1 to 10.

The quality coding procedure consisted of two steps: first, the case formulations were divided into one or more explanatory hypotheses; second, these explanatory hypotheses were coded for quality. An explanatory hypothesis consists of at least a sentence or part of an enumeration, and is (part of) an argument (e.g., “One possible reason for the client’s depression is his uncertainty at work.”). Repetition of vignette information is not considered an explanatory hypothesis. The first and last author segmented the case formulations into explanatory hypotheses and then coded these hypotheses for quality. The inter-coder agreement of segmentation was calculated using the method proposed by Strijbos, Martens, Prins, and Jochems (2006). Percentages agreement ranged from 72% to 93% and were considered satisfactory. To assess inter-coder reliability of the quality coding of the explanatory hypotheses, we calculated Cohen’s Kappas. The categories testability and specificity, Cohen’s Kappas were unsatisfactory (.46 and .53, respectively). These categories were removed from further analyses. Cohen’s Kappas of the other categories were: .72 (form), .62 (relations), .82 (relevance), .68 (consistency), .70 (modifiability of causal factors), and .76 (positive indicators for treatment). These were considered satisfactory (cf. Landis & Koch, 1977). A copy of the coding schema is available from the first author.

Coding Content Case Formulations

To examine the relation between case formulations and treatment decisions, we investigated the kind of explanatory mechanism described, if present. To assess these explanatory mechanisms, we adopted Part C of the Case Formulation Content Coding Method of Eells, Kendjelic, Lucas, and Lombart (received in personal communication, see Eells et al., 1998, 2005). This Part C distinguished nine categories:

1. Psychological mechanism general,
2. Problematic aspects/traits of the self,
3. Problematic aspects of relatedness to others,
4. Dysfunctional thoughts and/or beliefs,
5. Problems to manage emotions,
6. Defense mechanism or coping style,
7. Skill, social learning, or behavioral deficit,
8. Biological mechanism, and
9. Social or cultural mechanism.

The content of the explanatory mechanisms was categorized solely to investigate the relationship between causal mechanisms and treatment decisions. Apart from statistically relating these categories with treatment decisions, we did not look at what exactly people said, and no further analyses were performed on the content of the explanatory mechanisms.

The content coding procedure consisted of two steps: first, the case formulations were divided into Content Units (CU); second, these CUs were coded for content. A content unit is a proposition on semantic grounds, that is a simple declarative sentence. The largest and most frequently occurring unit is a complete sentence. Sentences that contain several propositions can be divided further, depending on their meaning. The first and last author segmented the case formulations into CUs and then coded these CUs for content. The inter-coder agreement of segmentation was calculated using the method proposed by Strijbos et al. (2006). Percentages agreement ranged from 72% to 94% and were considered satisfactory. To assess inter-coder reliability of the content coding of the CUs, we calculated Cohen’s Kappas. Cohen’s Kappas for the categories were: .66 (psychological mechanism general), .73 (problematic aspects/traits of the self), .75 (problematic aspects of relatedness to others), .62 (dysfunctional thoughts and/or beliefs), .59 (problems to manage emotions), .66 (defense mechanism or coping style), .62 (skill, social learning, or behavioral deficit), .67 (biological mechanism), and 1.0 (social or cultural mechanism). These were considered satisfactory (cf. Landis & Koch, 1977). A copy of the coding schema is available from the first author.

Statistical Analysis

To test the effect of complexity of the two cases on the quality of the case formulations, a paired sample t-test was performed on the mean overall quality of explanatory hypotheses calculated for each vignette. To test the effect
Table 1. Descriptions and examples of the quality coding categories

<table>
<thead>
<tr>
<th>Description coding category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form: Simple hypothesis</strong></td>
<td>“The dissociative disorder seems to be a consequence of early trauma.”</td>
</tr>
<tr>
<td>A hypothesis containing only one direct factor.</td>
<td></td>
</tr>
<tr>
<td>A direct factor immediately precedes or follows the part to be explained (explanandum).</td>
<td></td>
</tr>
<tr>
<td><strong>Form: Composite hypothesis</strong></td>
<td>“Poor self-worth, inhibition of aggression and a dependency-autonomy-conflict lead to the development of the disorder.”</td>
</tr>
<tr>
<td>A hypothesis containing two or more direct factors (no indirect factors).</td>
<td></td>
</tr>
<tr>
<td><strong>Form: Causal chain</strong></td>
<td>“Stressful traffic situations trigger anxiety symptoms. Stress at the workplace increases her general vulnerability for such anxiety states, and her avoiding behavior reinforces the problem.”</td>
</tr>
<tr>
<td>A hypothesis containing one or more direct factors and at least one indirect factor linked together in a linear and unidirectional way.</td>
<td></td>
</tr>
<tr>
<td><strong>Form: Causal model</strong></td>
<td>“The depression has to be seen as a decompensation for overstraining, perfectionism and an exaggerated need for controlling and was precipitated by reorganization at his workplace. He reacted to the occupational insecurity with even more work and more control. Furthermore the diagnosis “arterial occlusion” has triggered fear by the patient – remembrance of his father – and a feeling of helplessness, which worsened the depression.”</td>
</tr>
<tr>
<td>A hypothesis containing several direct and indirect factors linked together in a nonlinear and bidirectional way.</td>
<td></td>
</tr>
<tr>
<td><strong>Relations</strong></td>
<td>“Triggering factor: uncertainty at work.”</td>
</tr>
<tr>
<td>Specification of the kind of relationship between two indirect or direct factors or between a direct and an indirect factor. For example: “strengthen,” “maintaining.” Statements such as “leads to” or “causes” are not sufficient.</td>
<td>“Her depressed feelings reinforce the experience of isolation and rejection.”</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
<td>“Her traumatic childhood experiences (abuse) may have caused the panic disorder.” Reference to information from the vignette: “abuse.”</td>
</tr>
<tr>
<td>Information in the hypothesis should be linked to either information from the vignette or the client’s complaint(s).</td>
<td></td>
</tr>
<tr>
<td><strong>Consistency</strong></td>
<td>“The avoidant behavior causes the panic attacks.”</td>
</tr>
<tr>
<td>A hypothesis should be an actual explanation for the problem, that is, it should not be circular, contradictory, or only a restatement of the problem.</td>
<td></td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>“The client’s controlling personality has intensified her anxiety disorder.” This statement shows sufficient depth of a construct described to explain the problem.</td>
</tr>
<tr>
<td>A hypothesis should have sufficient depth and does not require an explanation of the explanatory factor itself.</td>
<td></td>
</tr>
<tr>
<td><strong>Testability</strong></td>
<td>“The violent outbursts of her husband trigger her depressive episodes.”</td>
</tr>
<tr>
<td>A testable hypothesis is falsifiable, that is, it is clear what would constitute a counterexample to the hypothesis and observation of a counterexample would have to be practically feasible.</td>
<td></td>
</tr>
<tr>
<td><strong>Modifiability: Not modifiable</strong></td>
<td>“Her physical disability caused the development and maintenance of her disorder.” The client cannot change the physical disability herself.</td>
</tr>
<tr>
<td>A factor that is remote in time and that the client cannot influence him or herself.</td>
<td></td>
</tr>
<tr>
<td><strong>Modifiability: Indirectly modifiable</strong></td>
<td>“The constant humiliation by her partner causes and maintains her depression.”</td>
</tr>
<tr>
<td>A factor that is not remote in time and concerns someone from the client’s direct environment or some part of the living circumstances (e.g., work environment) that the client can influence partly.</td>
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(Continued on next page)
of complexity on the quality categories, the mean proportion of explanatory hypotheses in which a quality category was judged to be present was calculated for each quality category and vignette. Paired sample t-tests were used to test for differences between the two cases in the mean proportion explanatory hypotheses that: (a) were described as simple/composite hypotheses or causal chains/models, (b) described relations between causal factors, (c) were relevant, (d) were consistent, (e) contained directly, indirectly, or no modifiable causal factors, and (f) contained one or more or no positive treatment indicators. A Bonferroni procedure was used to maintain an overall significance level of .05. Effect sizes were measured using $r$ (Field, 2000).

To test the relationship between the participants’ theoretical backgrounds, the classifications, the explanatory mechanisms, and the treatment decisions, Guttman’s Lambdas (Goodman & Kruskall, 1954) were calculated. Guttman’s Lambda is an association index for nominal data that ranges from 0 to 1 and represents the extent to which one variable is of influence in the prediction of another variable. The value 0 means that the one variable is not at all of predictive influence, the value 1 that a perfect prediction can be made.

Results

The vignette we had intended to be the most complex was indeed perceived as most complex by 93% of the participants (mean complexity rating = 7.9, SD = 1.2). The mean complexity rating of the least complex vignette was 3.5 (SD = 1.6). One participant judged the vignette we intended to be most complex as least complex. A Wilcoxon test showed that the mean complexity rating of the most complex vignette was significantly higher than the rating of the least complex vignette ($Z = -12.22$, $p < .001$, $r = .85$).

Quality of Case Formulations

The mean number of explanatory hypotheses identified for the 211 participants was significantly higher for the most complex vignette ($M = 2.3$, $SD = 1.4$, range = 1–7) compared to the least complex vignette ($M = 1.7$, $SD = 1.1$, range = 1–6; $Z = -5.55$, $p < .001$).

Contrary to our hypothesis, the mean overall quality of the least complex vignette was higher ($M = 6.4$, $SD = 1.84$, range = 2–10) than that of the most complex vignette ($M = 5.3$, $SD = 1.74$, range = 2–9). The mean proportion of hypotheses containing directly modifiable causal factors was lower ($r = .26$), the mean proportion of hypotheses containing no modifiable causal factors was lower ($r = .30$), and the mean proportion of hypotheses containing directly modifiable causal factors was higher ($r = .52$). There were no significant differences between the two vignettes in the mean proportions of explanatory hypotheses for the categories form (all $r < .15$), consistency ($r = .03$), indirectly modifiable causal factors ($r = .17$), and positive indicators for treatment ($r = .06$). Note that for the categories form and indirectly modifiable causal factors, variability was high and the differences were not statistically significant, even though the effect sizes showed a small effect.

Relationship Theoretical Background, Diagnostic Decisions, and Treatment Decisions

The strength of the relationship between theoretical backgrounds, classifications, explanatory mechanisms, and
treatment methods was investigated using Guttman’s Lambda ($\lambda$).

### Theoretical Background

The participants indicated to which one of eight theoretical backgrounds they adhered (see Method, Participants). The theoretical background of the participants did not appear to be related to the treatment method they proposed for both vignettes (least complex: $\lambda = .015$, $p = .479$; most complex: $\lambda = .016$, $p = .316$). For example, one psychodynamically oriented clinician chose a cognitive-behavioral treatment method for the client with less complex problems while another psychodynamically oriented clinician chose a problem-solving treatment method.

### Classification

For the least complex vignette, 80% of the participants selected anxiety disorder and 20% selected anxiety disorder with depressive episode. For the most complex vignette, 55.5% of the participants selected dissociative disorder with depressive episode, 30% selected dissociative disorder, 7% selected posttraumatic stress disorder, 7% selected posttraumatic stress disorder with depressive episode, and 0.5% selected depressive episode. The classifications did not appear to be related to the treatment methods proposed, for either vignette. For both vignettes, $\lambda$ was 0 ($p$-values could not be calculated). However, this does not mean that the treatment methods were completely unrelated to the classifications. For the least complex vignette, 94% of the participants chose some form of cognitive-behavioral therapy (either cognitive, behavioral, mindfulness based, or cognitive-behavioral therapy). For the most complex vignette, 76% of the participants chose other therapies (such as trauma therapy), irrespective of the classification they selected.

### Explanatory Mechanism

At least one explanatory mechanism was described by 77% and 69% of the participants for the least complex and most complex case respectively. The same results on the relation between explanatory mechanisms and treatment methods for the least complex vignette were found as those on the relationship between classifications and treatment decisions ($\lambda = 0$, a $p$-value could not be calculated). Here too, almost all participants chose cognitive-behavioral therapy, irrespective of the explanatory mechanisms they had described. For the most complex vignette, the association between explanatory mechanisms and treatment methods is very weak ($\lambda = .012$, $p = .414$). The type of vignette appeared to be associated with the treatment methods more than theoretical background, classification, or explanatory mechanism, although still weakly ($\lambda = .23$, $p < .001$).

### Discussion

We investigated the influence of the complexity of client problems on the quality of psychologists’ case formulations of these problems. Furthermore, we examined to what extent these case formulations were associated with psychologists’ treatment decisions. Our results showed that...
the psychologists generated higher quality case formulations for a client presenting with less complex problems than for a client with more complex problems. Also, the case formulations were not associated more with the treatment decisions than the psychologists’ theoretical backgrounds or the classifications they provided for the clients’ problems.

Complexity of client problems appears to affect the quality of case formulations. Case formulations for complex client problems were less often relevant and contained descriptions of the relationships between causal factors less often, not modifiable causal factors more often, and directly modifiable causal factors less often. It seems that psychologists provide more adequate case formulations when it is least necessary: in less complex cases, for which an empirically supported treatment is available. The majority of psychologists indeed selected the recommended empirically supported treatment for the client with less complex problems.

The hypothesis of Kuyken et al. (2005) that especially for complex cases psychologists would give higher quality case formulations is not supported by our results. It seems that psychologists could construct an adequate explanation for the less complex case more easily. For this case, a client presenting with an anxiety disorder, a firm theoretical and evidence-based framework describing underlying mechanisms of the disorder is available, whereas this is lacking for the more complex case, a client presenting with a dissociative disorder. Psychologists should thus be able to more easily retrieve and apply information from memory for the less complex case. This would suggest that psychologists’ case formulations are schema driven.

In addition, the treatment decisions were in neither of the two cases associated with the kind of explanatory mechanisms the psychologists judged to be causing the clients’ problems. Strikingly, individualized formulations were not associated with the psychologists’ treatment decisions more than the DSM-IV classifications or the psychologists’ theoretical backgrounds. The clients’ overt complaints were most highly associated with the treatment decisions, although still weakly. The results suggest that other factors, such as guidelines or institutional policy, might also have influenced treatment choice, especially for the least complex case. For this case an empirically supported treatment was available: cognitive-behavioral therapy. The majority of participants did indeed choose some form of cognitive-behavioral therapy. Thus, for the least complex case, clinicians adhered to the guideline, irrespective of the classifications they selected, explanatory mechanisms they proposed or theoretical background they had. Apparently, cognitive-behavioral therapy can be applied flexibly to a variety of explanatory mechanisms as well as types of problems. In the most complex case, the associations between diagnostic decisions, theoretical orientations, and treatment decisions were as low as for the least complex case, but here no empirically supported treatment was available, and variability in type of treatment between clinicians was larger.

Furthermore, the relationship between theoretically driven explanations and treatment decisions described by Witteman and Koele (1999) was not found in the current study. Psychologists rather appear to decide on a treatment based on the clients’ patterns of complaints. This again supports the hypothesis that psychologists’ case formulations are schema driven.

There are some limitations to our methodology. First, the two case descriptions used presented clients with different disorders. Differences in quality of case formulations could have resulted from aspects related to the specific disorders, not only from a difference in complexity. For future research, case descriptions presenting clients with the same disorder should be used, varying only in complexity.

A second limitation is using the treatment method as the dependent variable to examine the relationship between case formulation and treatment decision. The treatment method might not be detailed enough to reflect the differences in the explanatory mechanisms described in the case formulations. There might be a stronger relationship between case formulation and a specific treatment goal (cf. Persons, 2006) and the same goal can be reached with different treatment methods. We plan to examine this relationship in a follow-up study.

A third limitation is the framing of the question. Different question formats have been used to investigate clinicians’ case formulations. In the study by Eells et al. (1998), a document analysis was performed and it is unclear what the instructions to the staff were at the time of writing their reports. In the study by Persons, Mooney, and Padesky (1995), participants were asked to rate predefined underlying cognitive mechanisms, instead of describing them in their own words. In the study by Kuyken et al. (2005), participants provided case formulations using a specific diagram as part of a workshop on this particular topic. The use of these different question formats might explain differences in the results.

A fourth limitation is the use of only one expert to group the DSM-IV classifications and treatment methods. Using only one expert might have biased the resulting categorization. For future studies, we suggest that a panel of experts is used.

Finally, self-selection of the participants may have resulted in a sample that is not representative of the target population. Despite an estimated low response rate, the sample size of the current study was large enough for statistical analysis. Generalization of results to the population of interest should be done with caution.

Implications for Clinical Practice

The quality of psychologists’ case formulations for a client’s problems depends on the complexity of these problems. We found that case formulations for a client with simple problems were of higher quality than those for a client with complex problems. Furthermore, these case formulations appear not to be related to psychologists’ treatment decisions. We conclude that classification of the problems suffices for an initial treatment plan and a swift start of the treatment. In-depth analysis of possible causes explaining the client’s problems might be more beneficial for determining the specific focus of the treatment later on.
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Marleen Groenier

Faculty of Behavioral Sciences
University of Twente
P.O. Box 217
7500 AE Enschede
The Netherlands
Tel. +31 53 4893558
E-mail m.groenier@utwente.nl

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