The Unfolding Case Formulation:
The Interplay of Description and Inference

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ABSTRACT

Single subject research (SSR) can complement findings from aggregated group data and contribute uniquely toward the goal of generating and generalizing scientific knowledge in psychology. The present study illustrates these assertions with psychotherapy case formulation research. In earlier work my team and I identified and operationalized multiple dimensions of quality in case formulations. These include comprehensiveness, formulation elaboration, precision of language, complexity, coherence, treatment plan elaboration, goodness-of-fit between the treatment plan and the rest of the case formulation, and systematic process in following an *a priori* conceptual scheme. Using these dimensions, we found that cognitive-behavioral and psychodynamic experts generated higher quality case formulations than novice and experienced therapists. Experts also generated more ideas in their formulations and reasoned more inductively than deductively. In the present study, we explore these results further by qualitatively examining the highest quality psychodynamic and cognitive-behavioral formulations on the most difficult patient material, and then compare these two formulations with the two falling nearest to the 25th percentile range in quality ratings. Our goals were to investigate expert reasoning processes in case formulation more closely and to illustrate how aggregated group data and single subject research can mutually inform each other. We close by suggesting characteristics of a practical measure of case formulation expertise that may facilitate further investigations.

Key words: case formulation, case studies, single subject research, cognitive-behavioral formulation, psychodynamic formulation, formal coding systems

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Many authors have asserted that single subject research (SSR) in psychology can serve not merely as a source of hypotheses to be explored later by putatively more rigorous comparisons of aggregated group data, but in itself can provide a basis for the generation and generalization of scientific knowledge in psychology and psychotherapy (e.g.,Barlow & Nock, 2009; Eells, 2007; Flyvbjerg, 2006; Lewin, 1931; Molenaar & Valsiner, 2005; Morgan & Morgan, 2001; Valsiner, 1986). One assertion is that studying individual subjects, the primary unit of interest in psychology, offers opportunities for analysis not afforded by analyses of

aggregated data. For example, many years ago Sidman (1952) demonstrated that the shape of individual learning curves can neither be derived from nor replicated by group data, a point later expanded upon by Bakan (1967). The merit of research using the individual as the unit of analysis has been amply demonstrated through the work of Ivan Pavlov, B. F. Skinner, Wilhelm Wundt, Hermann Ebbinghaus, Herbert Simon and others. Thorngate (1986) has cogently summarized the analytic approach of subject research as one of "analyze then aggregate" rather than "aggregate then analyze." The former strategy bases conclusions on an accumulation of separate analyses of single individuals whereas the conclusions of the latter strategy are based on a fictional "average" person. A strategy of "analyze then aggregate" can complement results of randomized clinical trials (RCTs) by studying relationships between phenotypes and genotypes in psychotherapy, and by providing insights into person-situation configurations that are considered as statistical error in RCTs. Further, they can do so in a time efficient manner that results in a better knowledge of the effects of an independent variable on both process and outcome (Barlow & Nock, 2009).

The primary purpose of the present study is to demonstrate that these two analytic approaches can provide distinct information and thus complement each other. The example used will be that of comparing expert and novice case formulations. In doing so, I will show how the two approaches generate knowledge that neither can generate separately.

THE STRATEGY OF AGGREGATE THEN ANALYZE
TO EXPLORE EXPERTISE IN CASE FORMULATION

Eells, Lombart, Kendjelic, Turner, and Lucas (2005) asked 22 expert, 19 experienced, and 24 novice cognitive-behavioral and psychodynamic therapists to generate case formulations extemporaneously in response to six brief vignettes. The therapists generated the formulations extemporaneously in interviews with experimenters and were given five minutes to develop each formulation followed by two minutes to consider a treatment plan. The vignettes varied by disorder (anxiety, affective and borderline personality) and prototypicality (low, high). The vignettes averaged 405 words and contained standard categories of information, i.e., identifying information, presenting problems, history of presenting problems, information about prior mental health care, developmental and social history, and mental status at the time of interview.

The novices were psychology graduate students relatively early in training. The experts averaged more than 20 years of experience, had published at least 8 or more publications on the topic of case formulation, had taught 20 or more workshops on formulation, and had supervised an estimated 90 or more therapists. The experienced therapists had similar years of experience as the expert therapists, but had supervised far fewer therapists, averaged less than one publication on the topic of formulation, and had given less than two workshops addressing formulation.

The formulations were audiorecorded, transcribed, segmented into idea units, content coded and coded for multiple dimensions of quality. The quality dimensions included comprehensiveness, coherence, precision of language, the degree to which formulation themes and the treatment plans were elaborated, complexity of the formulation, the link between the

formulation and the treatment plan, and the extent to which therapists appeared to apply a systematic process in developing the formulation across the cases.

Results were obtained by submitting the mean frequency scores of the novice, experienced, and expert therapists to analysis of variance. A summary is shown in Figure 1 and complete results may be obtained from Eells et al. (2005). As shown, the experts produced higher quality formulations than the nonexperts. Figure 2 shows the results from a median split of the formulations. As indicated, the experts produced many more formulations above the median than the novices and experienced therapists. Effect sizes across the overall ratings ranged from medium to large.

The next step in the group-based analysis was to focus on the process of generating the case formulations in our sample of clinicians (Eells et al., in press). We asked, if experts produce higher quality formulations than novices and experts, how do they do so? Specifically, did they generate more ideas than the other therapists, and what reasoning processes did they follow as compared to the nonexperts? In accord with research in cognitive science, we conceptualized reasoning processes as "forward" or "backward" efforts to solve problems. Forward reasoning involves working from descriptive information to hypotheses, moving efficiently in relatively small inductive steps until one reaches a problem solution (Hunt, 1989). When combined with a well-integrated and well-indexed representation of a problem in working memory and an expansive knowledge base, forward reasoning can lead to efficient and accurate problem solutions (Simon & Simon, 1978). In contrast, backward reasoning involves the generation of data on the basis of a hypothesis (Patel, Groen, & Arocha, 1990).   It involves deductive processes because it begins with solutions and then searches for supporting data. Several studies have found that experts use more forward reasoning than novices (Larkin, McDermott, Simon, & Simon, 1980; Patel, Groen, & Frederiksen, 1986; Patel & Groen, 1986).

In order to analyze forward and backward reasoning, we content coded the formulations, one idea unit at a time, according to a system developed by Eells, Kendjelic, Lucas and Lombart (1998). The coding system is called the *Case Formulation Content Coding Method (CFCCM)* and its scoring form is presented in Appendix A. The CFCCM is cross-theoretical and contains four major informational categories: descriptive, diagnostic, inferential, and treatment planning. Each of these major categories contained subcategories as shown in Appendix A. The coding rules permitted each idea unit to receive a code from each of the major categories. If multiple codes were applied to an idea unit – for example, if a therapist generated descriptive and inferential information within an idea unit – the codes were sequenced within that idea unit according to the order in which the therapist verbalized the idea. We defined a unit of forward reasoning as a contiguous and sequential description-to-inference (D → I) link among idea units. We defined a unit of backward reasoning as a contiguous and sequential inference-to-description (I → D) link.

Our coding process yielded 14,499 codes across all the formulations and a mean of 44.9 codes per formulation. The expert case formulators generated more descriptive, diagnostic, inferential, and treatment planning information than the nonexperts. With regard to reasoning patterns, we found that all the groups used both forward and backward reasoning, and limited

evidence that experts use it more than nonexperts. More specifically, we found an odds ratio of 2.22 for description-to-inference links for the entire sample, meaning that a piece of descriptive information was 2.22 times as likely to be followed by inferential information as by additional description, a diagnosis, or treatment information, thus suggesting forward reasoning. We also found an odds ratio of 2.00 for inference-to-description links, suggesting the presence of backward reasoning as well. Odds ratios of similar magnitudes were found for the novice, experienced and expert therapists and no statistically significant differences were observed among the groups. However, the experts generated more D → I links and more I → D links than the experienced therapists but not novices, providing limited support for greater forward reasoning and backward reasoning among the experts. In addition, the experts generated more D → I links than I → D links, suggesting more forward reasoning than backward reasoning.

To summarize the aggregate-then-analyze strategy, the experts produced higher quality formulations than the nonexperts, and they also produced more description, diagnostic information, inferences, and treatment planning ideas than the other two groups. All groups showed evidence of forward and backward reasoning, with some evidence suggesting that this pattern of reasoning characterized the expert therapists more than the other groups.

THE STRATEGY OF ANALYZE THEN AGGREGATE
TO EXPLORE EXPERTISE IN CASE FORMULATION

To better understand the above results, we next pursued the method of studying the "concrete situation," as Lewin (1931) described. Lewin recommended studying psychological phenomena by selecting cases that represent the best exemplars of phenomena rather than the average case. By pursuing this strategy, he asserted, one is better able to understand the central characteristics of the phenomena. We pursued Lewin's approach in the area of psychotherapy case formulation development by identifying the best exemplars of case formulation skill and comparing the development of these formulations to those that are more ordinary. First, we selected the vignette that the therapists rated as the most difficult to formulate. This was the low prototypical borderline personality case who we called "Sharon." The entire vignette is shown in Appendix B. Our rationale was that the most difficult case would best bring out the skills of the best case formulators. Next, we identified the psychodynamic (PD) and cognitive-behavioral (CB) formulations of Sharon that were rated highest in quality. These were produced by an expert CB therapist and an experienced PD therapist. On a scale ranging from 0 to 39 with a mean of 24.1 ($SD = 3.1$), the overall quality scores of these formulations were 31.2 and 30.7. The more ordinary formulations were the PD and CB formulations nearest to the 25th percentile on the total quality measure. These were produced by an experienced CB therapist and an experienced PD therapist. The quality scores were both 21.7. Figure 3 shows how each therapist scored on each of the eight individual quality measures. As shown, the PD and CB formulations rated highest in quality differed from those at the 25th percentile primarily in being more comprehensive, in following a systematic process, and in being more coherent.

Next, we plotted the descriptive, inferential and treatment ideas for each of these formulations in cumulative frequency graphs (Figures 4-7). Due to the low number of diagnostic statements in the formulations, we combined the diagnosis codes with the inference codes. The

advantage of a cumulative frequency graph is that it shows the descriptive, inferential, and treatment-related elements unfolding dynamically across the seven minutes the therapists had to present their formulations and treatment plans. In what follows, we will describe the four cumulative frequency graphs with reference to the content of the formulation.

High Quality Psychodynamic Formulation

Figure 4 shows the cumulative frequency graph for the highest quality psychodynamic formulation. Three general observations can be made based on the figure. First, the therapist generated 34 idea units (IUs) and 51 content codes in the formulation, 9 more codes than the mean of 44.9 for the entire sample. In light of the high quality score and the concentration of codes within IUs, one could infer that the therapist used language efficiently and densely. Second, although the number of descriptive and inference codes are approximately equal by the end of the formulation, the amount of description always exceeds the amount of inference as the formulation unfolds, until the very end. This pattern suggests that the therapist made inferences that were closely tied to the case material provided. Note also that description and inference co-occur closely, as illustrated by the dual positive slopes. Third, the treatment plan was developed only after much had been said about the case material and several inferences had been offered. Treatment plan ideas were catalyzed by the interviewer's prompt, suggesting that this therapist may have had much more to say about the formulation were it not for the prompt, which was required by the study design. It makes sense that a therapist would develop a formulation first, then a treatment plan.

To further understand Figure 4, it is necessary to turn to the text. In doing so, the following notation will be used: Each formulation excerpt will be italicized and put in quotation marks and then followed by brackets indicating the idea unit number and the formulation code the idea unit received. The meaning of the code can be determined by referencing Appendix A. If both description and an inference are coded within an IU, the sequence is indicated by an arrow ($\rightarrow$).

The PD therapist with the highest overall quality score on the Sharon vignette begins the formulation with descriptive information:

> *"We have a 34-year old woman here who presents with two obvious issues which are related to each other but are distinct"* [IU1: 1]. *"One is that she was in her third psychotherapy when she abruptly terminated the treatment without any explanation that is apparent here, either from my contact with her therapist or from what she has told me"* [IU2: 3 $\rightarrow$ 18]. *"The interviewer fails to, in my opinion, adequately explore the sentence that there were problems she felt she couldn't explore with him"* [IU3: 9.3]. *"I would be centrally focused on that issue, since it's a precipitant for her coming to me and my prescription and my formulation would be very dependent on what those problems were that she felt she couldn't explore in depth and even more dependent if she couldn't tell me what they were"* [IU4: 9.3 $\rightarrow$ 18, 30.3].

The therapist begins with a forward reasoning process, citing descriptive information, for example identifying information and past history of mental health care, even wishing for more than was present in the vignette, then inferring a precipitating stressor, i.e., her abrupt departure from her previous therapist.

In IUs 5 through 9 the therapist identifies two additional problems, and then makes inferences about them. He states,

> *"The other area is her obvious marital difficulties, which sound like a sort of armed truce or standoff in the marriage without any description here of how the transition occurred from what was initially described as a man who filled the void inside of her and provided her with a strong sense of who she was, but now that the marriage is not satisfying, and sexually unfilled and isn't working" [IU5: 18 → 9.6]. "There is also no discussion in the database about her relationship with her two-year-old daughter, an issue I think would be particularly critical in view of the marital tensions and the history of her own adoption" [IU6: 9.6 → 17.1] . "One would expect important issues of her core and conscious fantasies" [IU7: 16]. "Her sense of self could be replayed in her relationship with this first child" [IU8: 19.2]. "So the data is weak here" [IU9: 9.6].*

Although the therapist is ostensibly developing a problem list from the material provided in the vignette, he is also evaluating and weighing the case material, assessing where he needs more information, and making inferences based upon it. These sequences appear to reflect a forward reasoning cycle, beginning with case material and then moving beyond it to try to understand the patient.

In IUs 10 through 12, the therapist identifies Sharon's "central theme", combining descriptive and inferential information in each IU. He states,

> *"What I do get though is someone who is highly defended, hard, tense and seeks assistance,"* [IU10: 19.5 → 7] *"but is object seeking in terms of the marriage, in terms of the three therapists but finds herself frustrated and dissatisfied with the relationships that do develop with those objects, and either disrupts them or they turn sour on her"* [IU11: 19.2 → 3]. *"I would see that pattern, both in the therapies and in her life as the apparent central theme of her disturbance and pathology would be the symptoms she describes sounding more secondary to that rather than reflecting some primary psychiatric disorder"* [IU12: 19.2 → 3 –> 13].

Overall, it appears that the therapist has examined the data, evaluated its quantity and quality, and then uses what is available, relying on a less than comprehensive set of information, to develop a central theme based on a pathological interpersonal behavior pattern.

In the remaining IUs the therapist first rules out the likelihood of biological factors, then begins to discuss the treatment implications of the core theme he identified. He says,

> *"There is a story of suicide, but it's not her biologic relative and there's really no description of any biologic, or of any family diathesis that would have any biologic significance"* [IU13: 3.1 → 20].

Returning to the central theme, he says,

> *"I would think that the risk to the therapy relationship with this pattern is so obvious and the story of her coming after the abrupt termination of her previous therapy so central, that a major issue for me in dealing with a patient like this would be to, at the very beginning of the contact, suggest to her that with this story it would seem highly probable that we could predict that a similar pattern would be likely to evolve in our relationship and it would be best to discuss how to understand that and what to do about it now rather than wait for it to occur"* [IU14: 23 → 3].

Although focused on intervention, this excerpt was coded as an inference about a potential therapy-interfering event. The therapist then elaborates on this point until the question explicitly eliciting a treatment plan is asked.

In summary, the therapist begins with a thoughtful review and consideration of problems, then articulates a central problematic theme revolving around interpersonal relationship patterns, and concludes by discussing the implications of the pattern for therapy. He appears to make primary use of forward rather than backward reasoning. It is notable that in reviewing the given descriptive data, he evaluates it, makes inferences from it, and uses it to suggest related possible problems. Further, he uses precise language, interweaves multiple aspects of the case material presented, and ties it together into a coherent and succinct central theme.

High Quality Cognitive-Behavioral Formulation

We can also begin discussion of the highest quality CB formulation of Sharon (Figure 5) with some general observations. First, unlike the previous formulation, a very high number of IUs were used. At 84 codes in 86 IUs, this therapist generated nearly twice the number of codes as the average therapist, and relatively few of which idea units included multiple major coding categories. This therapist used short sentences. Second, as with the first therapist, the formulation begins with several descriptive comments, then moves to inferences. Third, as with the first therapist, this therapist intertwines description and inference through much of the formulation. Finally, also in common with the first formulation, treatment statements are not developed until much of the formulation has been developed. Again, to understand the reasoning process, one must turn to the text.

This CB therapist begins with statements that were not coded:

> *"Let's think. What is her problem?"* [IU2]) before using descriptive information to develop a problem list: "*We don't have a very clear – let's see. We see that what? She's got difficulty sleeping"* [IU4: 2]. *"Vague feelings of dissatisfaction with*

herself" [IU5: 2]. *"History of brief bouts of anxiety"* [IU6: 2]. *"Uncomfortable when alone"* [IU7: 2].

The first inference is then offered in the form of an inferred problem: *"So we've got these vague anxiety depression symptoms"* [IU9: 16 → 2]. Next, the therapist makes an inference that coders scored as a problematic aspect of relatedness to others: *"There seems to be some issue about being alone"* [IU10: 19.2]. *"Difficulty being alone which seems a little more important than some of these other vague symptoms"* [IU 11: 19.2]. Like the previous therapist, this therapist gives greater priority to problems related to self and relationships rather than viewing psychiatric symptoms as primary.

The therapist continues developing the problem list:

> *"Now, she's got some interpersonal difficulties"* [IU13: 19.2]. *"We don't know very much about those here, but I would be putting it on my problem list"* [IU14: 16]. *"If she spent six months in a therapy and the colleague felt the therapy was going well, and Sharon says that the therapist was good, but there were problems she couldn't explore with him, she's got some deficit in her ability to relate interpersonally"* [IU15: 3 → 19.2].

Note the forward reasoning style of reasoning. Like the preceding PD therapist, this CB therapist lists several pieces of descriptive information then concludes with an inference about problematic aspects of relatedness to others. Note as well that, like the previous therapist, the activity of creating a problem list is not merely listing descriptive information, but moving beyond it and making numerous inferences.   For example, the CB therapist infers a problem that is strongly implied but not explicitly stated in the vignette:

> *"We've got a marital problem, right?"* [IU16: 16]. *"The husband, we hear, expects her to report where she goes whenever she leaves the house"* [IU17: 6]. *"And she's angry at him and the way she expresses that is she won't let him touch her"* [IU18: 16 → 6].

The therapist continues for another nine idea units constructing a problem list, for example:

> *"She has a history of in the past having no friends. I'd be looking around at the current friendships and seeing"* [IU24: 21.1 → 9.6]. *"She has a history of some drug use"* [IU25: 3]. *"I'd be having a question of substance abuse"* [IU26: 9.3 → 14]. *"I'd want to make sure – so that's a problem list"* [IU27: 32].

A transition then occurs as the therapist states,

> *"Views of self. This is a complex case"* [IU28: 19.1]. *"What is this patient's view of herself? I'm not sure"* [IU29: 9]. *"View of others. What has she got?"* [IU32: 9.6]. *"She has this husband that she describes as controlling, unsupportive and*

aloof" [IU33: 6]. *"Others are controlling, unsupportive and aloof"* [IU34: 19.2 →
6].

The therapist appears to be relying on an a priori case formulation structure, which
involves creating a problem list then inferring concepts of self and others. As the formulation
unfolds, the therapist continues to struggle with Sharon's view of self and others, making
tentative inferences and repeatedly expressing the wish for more specific information about her,
for example, her work functioning, her relationship with her daughter, her mother and father, and
her husband. The therapist infers positive as well as negative views of self and others, for
example, observing, *"there's some sense that others can be supportive – we would guess"*
[IU63: 22.2], basing this on Sharon's statement that she is *"Devoted to her father"* [IU58: 5],
but also observing, *"I can't quite get whether the father was devoted to her"* [IU59: 9.5].

This therapist concludes the formulation section by reflecting,

> *"One thing I notice about her is I have a weaker problem list than I usually have,
> like especially this sense of vague complaints, which again, I would assume reflects
> this patient's vague sense of herself"* [IU68: 19.10]. *"She's not even able to come to
> treatment and say, 'I'd really like to work on this, this and the other"* [IU69: 23].

To summarize, this formulation has a strong structure. It begins by building a problem list
then moves to developing ideas of Sharon's self image and her image of others. The therapist
stays very close to descriptive information, and like the first formulation, appears to use a
forward reasoning strategy in which the descriptive information plays a stronger role than a
theoretical perspective in determining the formulation.

Comparison Psychodynamic Formulation

The comparison PD formulation was generated by an experienced clinician. In contrast
with the preceding formulations, it has fewer overall ideas than the average formulation. As
shown in Figure 6, the formulation is also dominated by relatively more inference than
description, starting with the initial statements. Further, unlike the preceding two formulations,
treatment ideas are offered before the formulation is developed.

This therapist begins by comparing Sharon with the previous vignette in the study, which
was a highly prototypical anxiety case:

> *"I have a little bit different response to this vignette than I did to the first one, in the
> sense of thinking about this as there's something more problematic here"* [IU1: 15].

She continues,

> *"My interest in treating this person remains high"* [IU2: No code], *"but the abrupt
> termination with a colleague raises a flag that there was something encountered in
> the therapy that she wasn't able to deal with"* [IU3: 3 → 23] *"and I know that's*

going to happen again" [IU4: 23]. *"On the other hand, and this is because I'm a female reading if this vignette, this may be different, this vignette, I guess, would be presented to a male"* [IU5: No code]. *"It was pointed out, I think, her treatments before have been with male therapists"* [IU6: 3]. *"I might initially feel that maybe that I had a little bit of an edge on the situation being female, but I also know that this has limitations as well"* [IU7: 34]. *"I mean, this is not going to make it automatically go better"* [IU8: 34].

The inferences themselves are presented in a less precise and more general manner than was the case in the preceding formulations. For example, the therapist states,

> *"The way that it's presented does raise the question with me of some kind of sexual problem of some sort, maybe some kind of a trauma that she's not remembering, although it's clear in the history that she is denying this, which doesn't mean it isn't true"* [IU12: 8 → 17]. *"Maybe that's the red flag that she's bringing that up"* [IU13: 17].

In a good forward reasoning example, the therapist then states,

> *"But the sexual problem with her husband and then the sexual involvement with a married professor in the past are other indications that there's something in that area that's problematic"* [IU15: 6 → 17].

The therapist then comments on the vague nature of the history: *"I'm already seeing this as a more problematic situation"* [IU17: 15]. Again, comparing with the previous vignette in the study, the therapist notes, *"There's more acting out, is another thought that I had in this vignette, as opposed to the first one"* [IU20: 19.5].

The therapist then comments,

> *"The adoption, of course, raised my interest, too, that this is always an issue in some way or another"* [IU22: 5 → 17]. *"The mother she describes as passive"* [IU23: 5]. *"There's some information about parents"* [IU24: 5]. *"Now the history of suicide in the family, I'm not sure what to make of that"* [IU25: 3.1]. *"I don't know if that's a biologic history or if this is her adoptive parents' history, which both could be significant, but one would be a little different than the other"* [IU26: 9.3 → 20].

The therapist closes the formulation by stating,

> *"Again, I'm not thinking about medication right off the bat, even though she's . . ."* [IU27: 39] *"What I'm thinking right off the bat is to get more history and to see how the engagement goes and how I feel that we're going to be able to work together"* [IU28: 9, 34].

In summary, compared to the others, this therapist has fewer inferences overall, drew less from the case material presented, and tends to use more inference than description. Notably, the reasoning process, whether primarily forward or backward, is more difficult to determine than with the previous formulations.

Comparison Cognitive-Behavioral Formulation

The cumulative frequency graph of the comparison CB formulation stands in contrast to the previous three (See Figure 7). Most prominently, the formulation is dominated by treatment-related ideas rather than descriptive and inferential information.   The therapist, an experienced CB therapist, initially offers an inference then begins developing a treatment plan interspersed with an occasional inference or piece of descriptive information. Second, the cumulative total of descriptive and inferential information is well below that of the two formulations rated highest in quality. This therapist produced 7 descriptive codes, 9 inferences, and 25 treatment codes for a total of 41 codes.

Looking at the text, the therapist appears to use a backward reasoning process. He begins with an inference related to diagnosis:

> *"I guess my first reaction as I was listening to the vignette, thinking about this case a bit, I began to think about some Axis II kind of diagnosis, that there may be some personality disorder things that are going on which may make her a little bit more challenging"* [IU1: 12].

He then embeds a piece of description and follows it with a treatment consequence:

> *"I guess I have some concerns initially about the fact that she saw a male colleague and would want to explore a little bit more therapy experiences that she's had vis-à-vis the gender of the therapist to get some idea about how she's interacting"* [IU2: 3 , 36.5].

Returning to a backward reasoning approach, he continues with an inference followed by treatment-related consequences:

> *"I have this hypothesis that she may have kind of a bit of a negative transference of sorts with a male therapist, and so I'd want to clarify that, if she would be comfortable and try to explore that a little bit with her before we really launch into much of any kind of therapy"* [IU3: 19, 34].

He continues to discuss treatment in the next three idea units, linking some treatment ideas to information in the vignette (in IU5):

> *"If that seemed to be okay and if she thought she would feel comfortable with a male therapist and that kind of thing, since she's therapy-wise, I would be wanting to have a sense right on the front end of what she would hope to gain from therapy and look*

at her expectations as to how realistic those were or not" [IU4: 33]. *"If she seems to be looking for something when she expresses an interest that maybe the therapy didn't go deep enough, I'm kind of wondering if she has some expectations about longer-term therapy or therapy that might be a little different than my more brief or cognitive-behavioral kind of approach"* (IU5: 3, 29.7]. *"Anyway, we'd have to clarify some of those kinds of issues"* [IU6: 33].

Returning to the descriptive information, he continues:

"I have some concerns about some things that were mentioned with regard to her relationship, find out a bit more about how she and her husband are getting along" [IU7: 9.6]. *"It sounds like there may be some potential for abuse there"* [IU8: 15]. *"Wanting to pursue that a little bit, see what the risk is as far as her safety, the safety of the child"* [IU9: 32].

Continuing the focus on treatment, he then says,

"I'm kind of guessing that if I were going to pursue and see her in treatment that I would want to find out what kinds of things had been done to help her with regard to anxiety and tension" [IU11: 9.3].

In the next several idea units, the therapist further discusses treatment, mentioning

". . . some use of relaxation with her" [IU12: 31.1], *"the possibility of using ". . . a little clinical hypnosis"* [IU14: 31], exploring *". . . some parenting kinds of issues"* [IU15: 37], and pursuing an *". . . assessment for medication"* [IU19: 39].

The therapist concludes by noting the grandmother's suicide

" . . . although the circumstances aren't known" [IU22: 3.1] *"But I'd begin to question about probably some genetic predisposition for a depressive disorder"* [IU23: 20 → 11].

In summary, this therapist begins with a consideration of diagnosis and proceeds to develop a treatment plan with relatively little development of a formulation beyond diagnosis.

COMPARISON OF THE TWO STRATEGIES

The premise of this paper is that the analytical strategies of "aggregate then analyze" and "analyze then aggregate" can complement each other and can each provide distinct information. The former may be best represented by the randomized clinical trial and the latter by a contextually rich and empirically supported clinical case study containing both qualitative and quantitative information. At this point, I briefly summarize what we have learned from each approach.

The aggregate-then-analyze approach concluded that experts produced higher quality formulations than non-expert therapists, that they generated more ideas in their formulations, and that their formulations appeared to be characterized more by a forward (or inductive) reasoning style.

The analyze-then-aggregate approach, applied currently by adopting Lewin's notion of analyzing the "concrete situation," was consistent with and built upon these conclusions. It showed that the best psychodynamic and cognitive-behavioral formulations of the most difficult vignette clearly used a more inductive than a deductive style of reasoning. What was not apparent from the group-based approach was how close to clinical case material the expert formulators stayed as they developed inferences and ultimately offered a core problem to focus on in therapy. In contrast, the more ordinary formulations tended to be more general and vague, and to offer inferences without having established a solid foundation in the case material. Alternatively, they leapt past that material and proceeded to a treatment plan.

The analyze-then-aggregate approach also showed that contextualizing the quantitative material by examining the text of the case formulation added considerably to understanding the case formulation process. In systematically reviewing the text, it became clear that the expert therapists continually reflected on the case material, assessed where more information was needed while making the best use they could of what information they had, sought to identify patterns in the material, and adhered to a systematic and disciplined process in considering the case.

In summary, the aggregate-then-analyze strategy approached the issue of expertise in case formulation from a decontextualized framework, providing information about how the average expert generated formulations across six separate vignettes, as compared to non-experts. The analyze-then-aggregate approach provided context and meaning, and allowed one to see larger patterns emerge in the highest quality formulations as they were generated.

It is also constructive to consider what these two approaches do not tell us. Neither tells us about the role of formulation in the context of an actual therapy. Second, neither study provides information about the role of formulation in psychotherapy outcome or how formulation affects the process of psychotherapy. Third, our analyze-then-aggregate approach examined just four of the 390 formulations examined in our prior studies (Eells, et al., 2005; Eells, et al., in press), and thus results should be considered as preliminary. Ideally, cumulative frequency graphs for each of the 390 formulations would be developed and analyzed then aggregated.

NEXT STEPS: DEVELOP A MORE EFFICIENT MEASURE OF CASE FORMULATION COMPETENCE

In order to further develop our knowledge of the role of case formulation in psychotherapy, it is important to have useful psychometric instruments. Our case formulation content coding method proved to be useful and reliable; however, it is time intensive, expensive,

and requires considerable training, Thus, a more practical and efficient tool is necessary to evaluate case formulation skill. In addition to its uses for research, such a tool could also assist in the assessment of competency in clinical training, board exams and licensure exams.

One step toward developing a more practical case formulation assessment measure is to shift from a sole focus on expertise, which suggests performance and an extremely high level of proficiency, by adding a focus on case formulation competence, viewed as a level of skill sufficient to perform the task proficiently. A second step would be to develop a psychometric tool that can be learned and applied with relatively ease and speed. To be generally useful, it should be adaptable to any form of psychotherapy and theoretical or empirical basis for case formulation. Following the pattern of the CFCCM, the measure could have four general content components: descriptive, diagnostic, inferential, and treatment planning. In addition to content, it should measure case formulation quality and process. In this section we discuss how the Case Formulation Content Coding Method (CFCCM, see Appendix A; Eells, Kendjelic, Lucas, et al., 1998) could be used as a basis for developing such a measure.

Figure 8 presents a general model of case formulation-guided psychotherapy (Eells & Lombart, in press) that is adapted from the work of many others (e.g., Eells, Kendjelic, & Lucas, 1998; Fishman, 2002; Meier, 2003; Mellsop & Banzato, 2006; Persons, 2008; Peterson, 1991; Porzelius, 2002; Sperry, Gudeman, Blackwell, & Faulkner, 1992) and provides a beginning context for such an instrument. Psychotherapy is shown as a four-stage process with multiple feedback loops. It starts with gathering information, which leads into a multi-stage case formulation, then into treatment and ultimately to termination. Feedback loops involve a continual process of monitoring, assessing, and testing.

The case formulation process is central to the model in Figure 8. It contains four basic steps beginning with generating a problem list, then developing diagnosis, proposing an explanatory hypothesis of the problems and diagnosis, and finally planning treatment. The explanatory hypothesis contains two basic sources of information and four basic components. The basic sources of information are theory and evidence. The four basic components are precipitants, origins, resources, and obstacles. Precipitants refer to events that trigger problems or symptoms. They are the diathesis in diathesis-stress models of psychological disorders. Origins refer to an account of events that are hypothesized to have led to the development and onset of the symptoms and problems. Resources are characteristics and factors in one's life that should facilitate problem solving. These may include person strengths such as good social skills, good premorbid functioning, intelligence, motivation, and good functioning in one or more spheres of life. They may also include external factors such as family support, a good education, steady employment, or living in a safe neighborhood. Obstacles are characteristics and factors that may undermine success in solving the issues on the problem list. They are "red flags" the therapist must be aware of. Examples include alcoholism, prior history of a suicide attempt, a learning disorder, transportation problems, poverty, language difficulties, learning disorders, unemployment, or impulsivity.

Using a Likert scale, a measure of case formulation competence could assess each of these aspects of formulation in Figure 8. In the area of problem identification, for example, one

could include items such as the following: To what extent are problems clearly and comprehensively identified? Are problems prioritized with a rationale for the priority given? Are the problems specific and solvable? Are there major problems suggested by the case material that are omitted from the problem list?

In the area of diagnosis, one might ask, is a diagnosis offered that fits the problems and for which appropriate criteria is met? Are all axes from the diagnostic nosology addressed? Is a sufficient range of diagnostic possibilities considered? Is a principal diagnosis offered?

When evaluating the explanatory hypothesis, several questions are relevant for a case formulation competency scale. These include, to what extent is a general psychological theory offered that explains the problems and symptoms? Is that theory sufficiently and coherently articulated? Are key components of the chosen theory included? For example, if a psychodynamic theory is proposed, does it include basic components such as major dynamic conflicts, aspects of the patient's personality that are involved in the conflict, antecedent and developmental events leading to the conflict, adaptive and maladaptive compromise formations that comprise the patient's defensive and coping strategies, and the degree of awareness of the conflict (Messer & Wolitzky, 2007)? Is an explanatory hypothesis offered that adequately accounts for the problems? In place of a general psychological theory, one might ask, is an explanatory hypothesis offered that is implicit in a standardized, manual-based therapy? Or, is a theory offered that is consistent with a reliable, structured model of case formulation? Are the prescribed components of these models discussed? Several structured models exist, for example, Luborsky's Core Conflictual Relationship Theme (Luborsky & Barrett, 2007), which contains three components of a core relationship problem that may lie at the center of a patient's presentation: wishes of the self, expected response of the other, and response of the self.

The hypothesized explanatory mechanism could also be primarily evidence-based and be evaluated for competency on this basis. Sources of an evidence-based explanatory mechanism could be results psychometric testing, psychotherapy process and outcome research, psychopathology and general psychology research, and epidemiology (Eells & Lombart, in press). One could develop items for a case formulation competency assessing the presence and development of evidence-based explanations. One could also ask whether precipitants, origins, resources and obstacles are addressed.

With regard to treatment planning, one could ask, is a plan offered that flows logically and coherently with the preceding components of the formulation? Does the treatment plan include explicit goals with milestone achievements that lead to these goals? Are short-term as well as long-term goals set? Are potential red flag issues adequately addressed?   Are resources other than those the therapist can provide considered?

In addition to assessing content of a case formulation, multiple dimensions of quality as described earlier in this paper could be assessed. Comprehensiveness could be assessed by determining how many of a basic set of categories of information are considered in the formulation, such as items 15 through 23 in Appendix A. A simple Likert scale could measure

complexity, precision of language, coherence, elaboration of the formulation, goodness-of-fit of the formulation to the treatment plan, and elaboration of the treatment plan.

Finally, a measure of case formulation competence should include an assessment of process considerations. Questions could include whether the basic process shown in Figure 8 is followed, or whether there is evidence that any systematic process is being followed. Does the formulation adequately use case material provided? Are inferences supported by case material? Is any attention given to potential judgment biases on the part of the therapist?

There are many other questions one could generate for a case formulation competency scale, although the specific questions in a final scale would be determined psychometrically. The result would be a reliable and valid measure that is quickly scored.   The dual use of such a measure and the full CFCCM for cases systematically selected for more intensive study could facilitate a richer understanding of the role of psychotherapy case formulation in psychotherapy process and outcome.

CONCLUSIONS

In this paper I have attempted to demonstrate how an accumulation of single subject analyses can complement group-comparison studies and add to our knowledge and understanding. The single subject approach provides contextualization that randomized clinical trials, and other group-comparison studies cannot provide. Psychotherapy case formulation is just one area of many where such a dual analytic strategy can be beneficial. Dattilio, Edwards, and Fishman (in press) recommend that such a dual analytic strategy be a required methodological expectation in the publication of group-based psychotherapy outcome studies, such as randomized clinical trials. . Barlow and Nock (2009) have made a similar argument, pointing out the efficiency and virtuous cycle between the two types of studies that can result. In light of these benefits, it seems the time has come to implement these recommendations.

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Figure 1. Mean Overall Case Formulation Quality
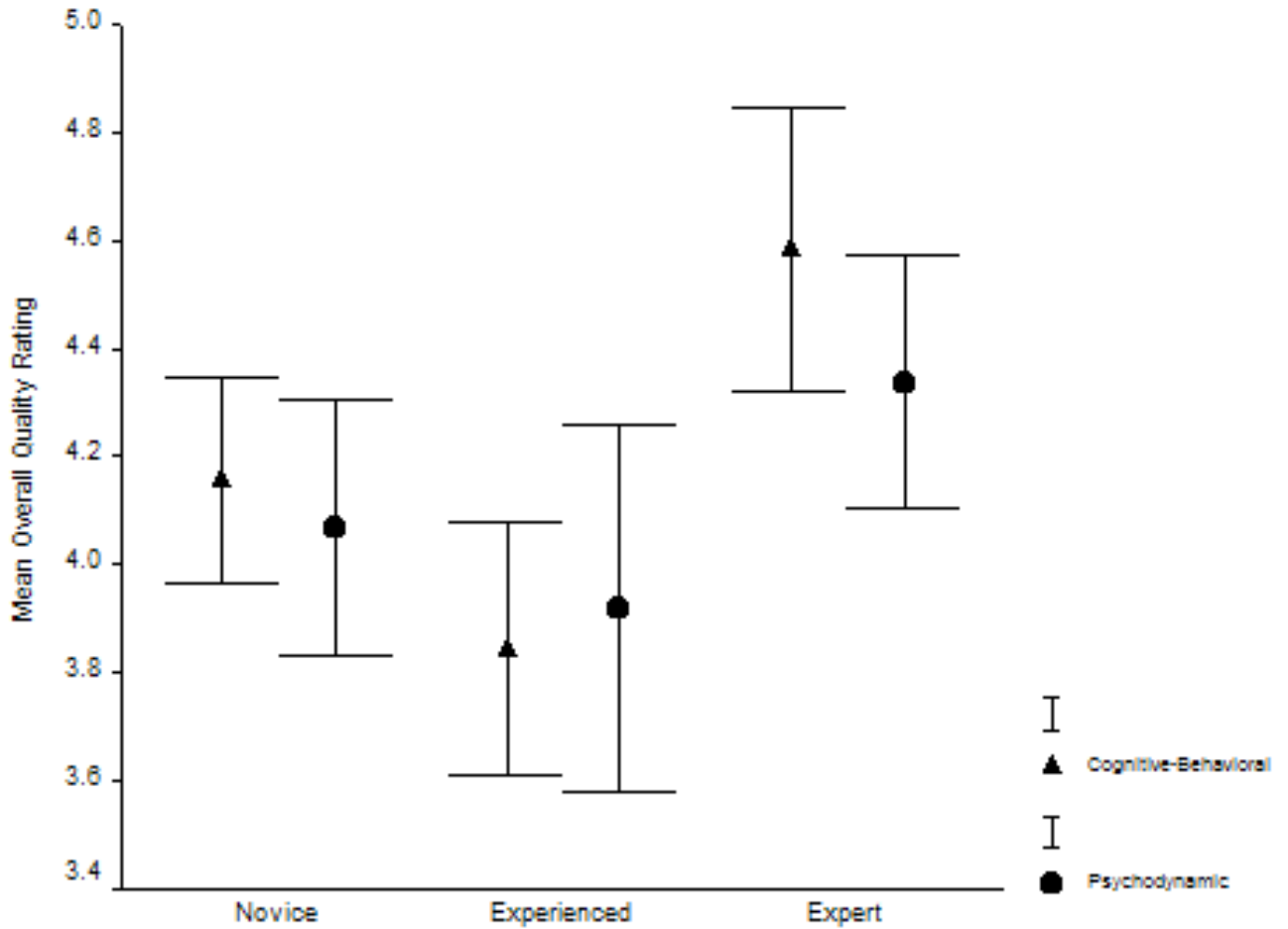
Note. Confidence intervals are 95%
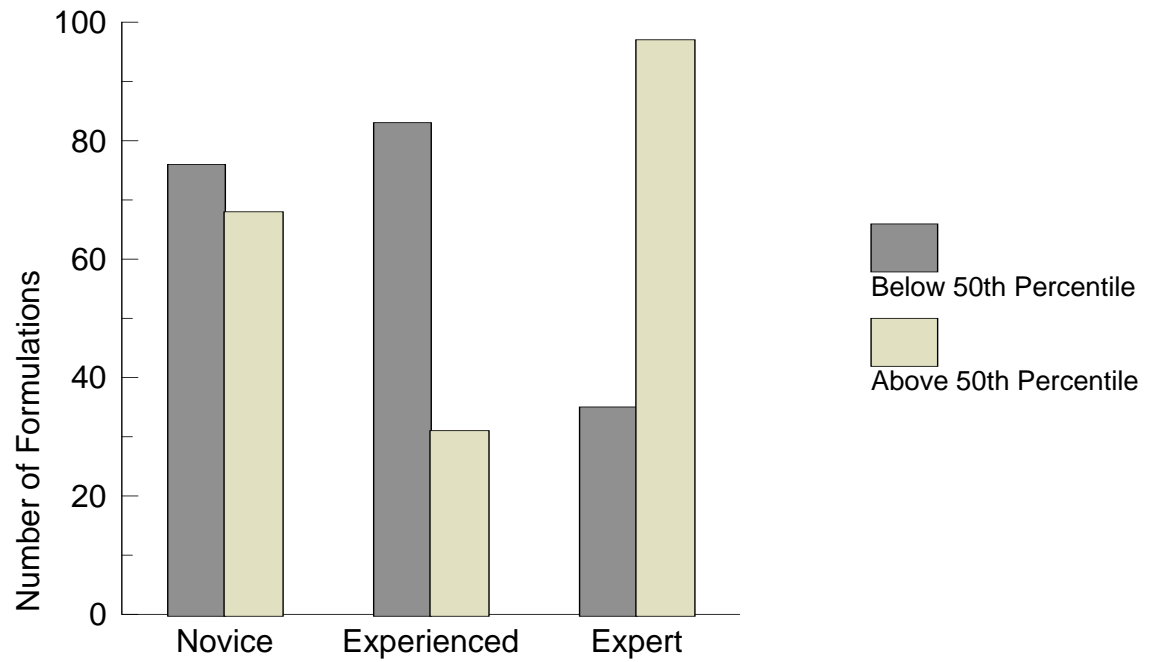
Figure 2. Median Split of Overall Quality Score

**Figure 3. Quality Ratings of Psychodynamic and Cognitive-Behavioral
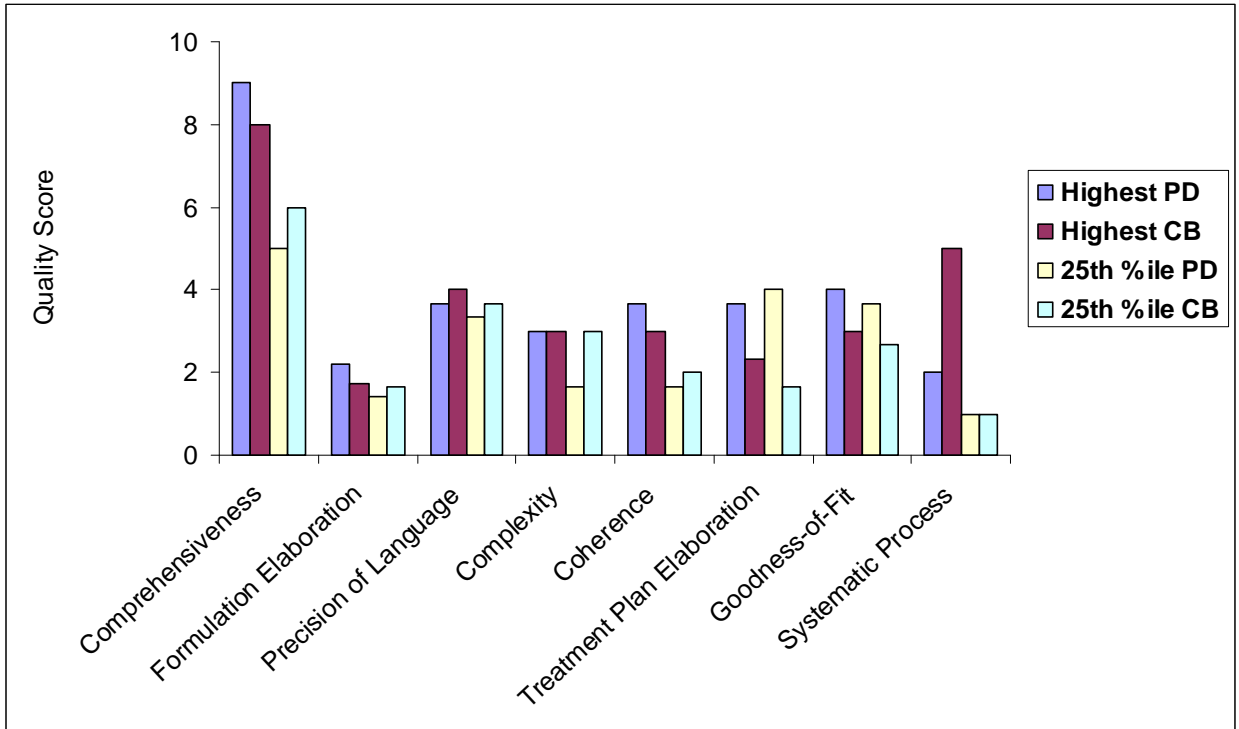Formulations Rated Highest and at 25th Percentile in Overall Quality**

Figure 4. Cumulative Frequency Graph of Psychodynamic
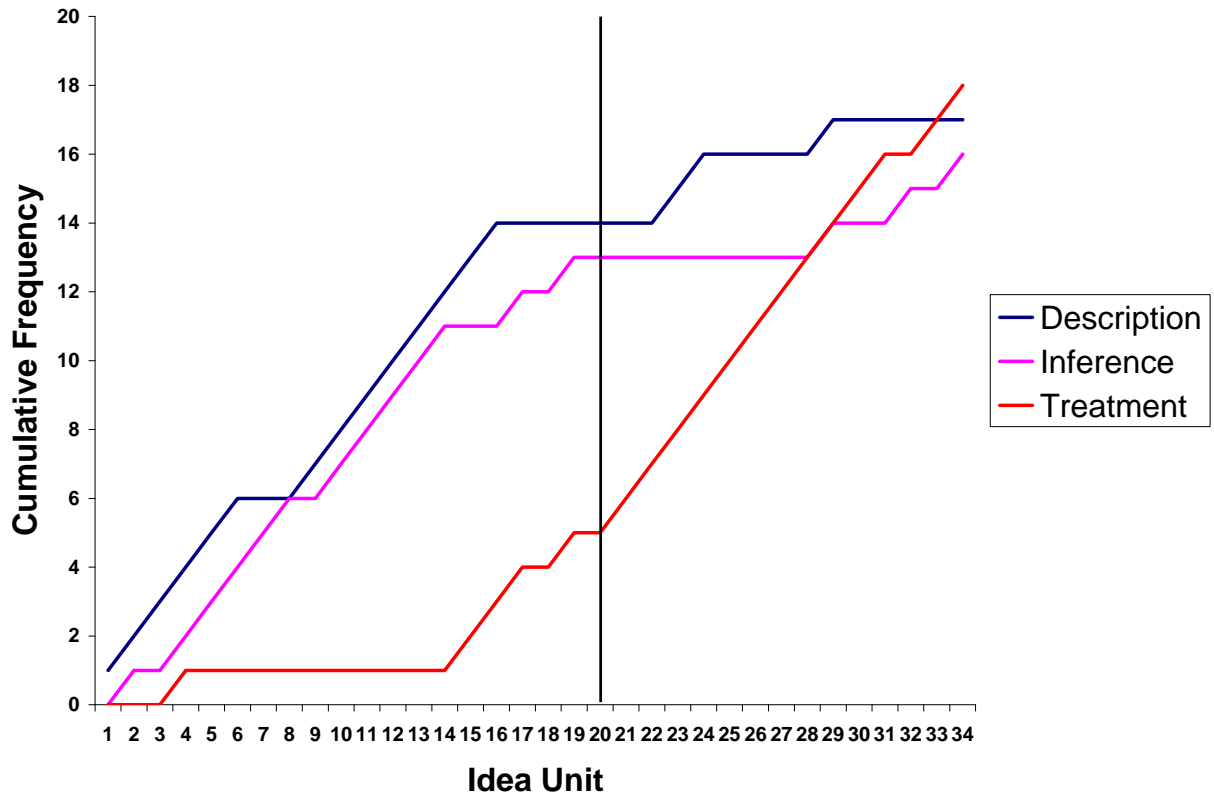### Formulation Rated Highest in Overall Quality on Sharon Vignette

Figure 5. Cumulative Frequency Graph of Cognitive-Behavioral Formulation Rated Highest in Overall Quality on Sharon Vignette
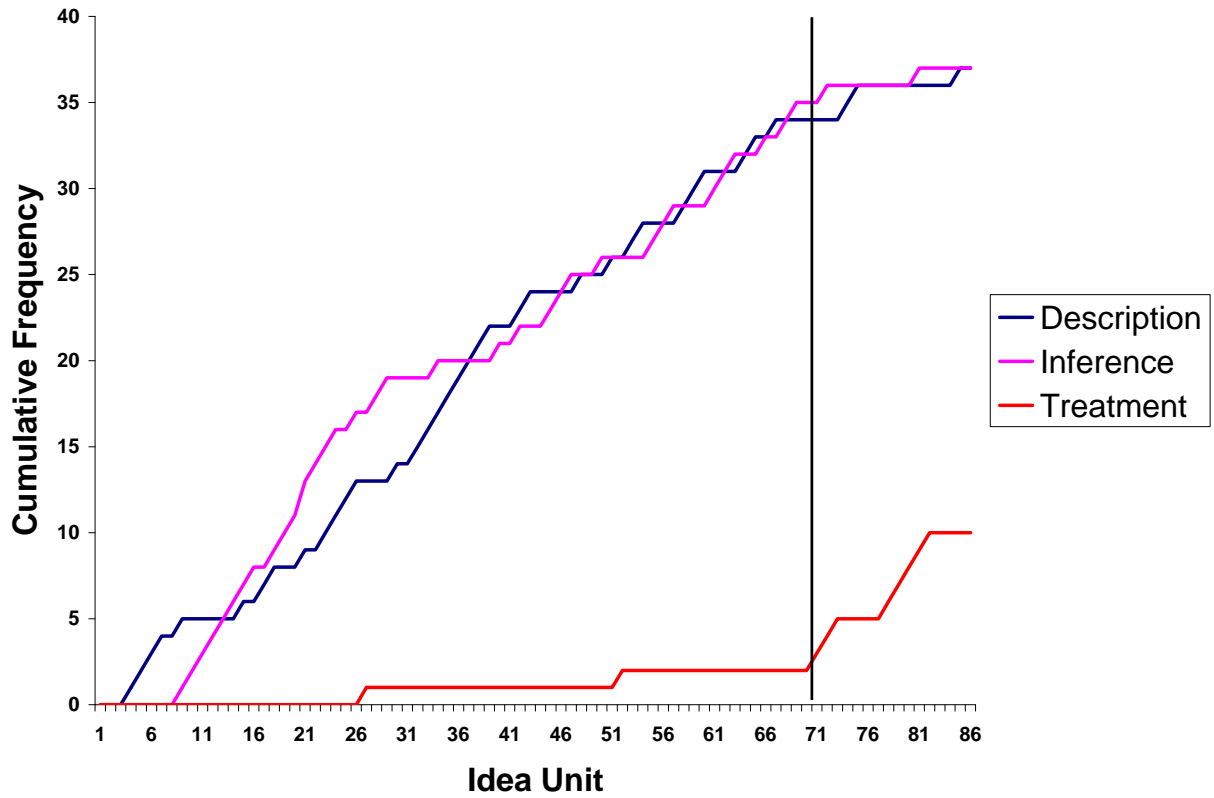
Figure 6. Cumulative Frequency Graph of Psychodynamic Formulation Rated at 25th Percentile in Overall Quality on Sharon Vignette
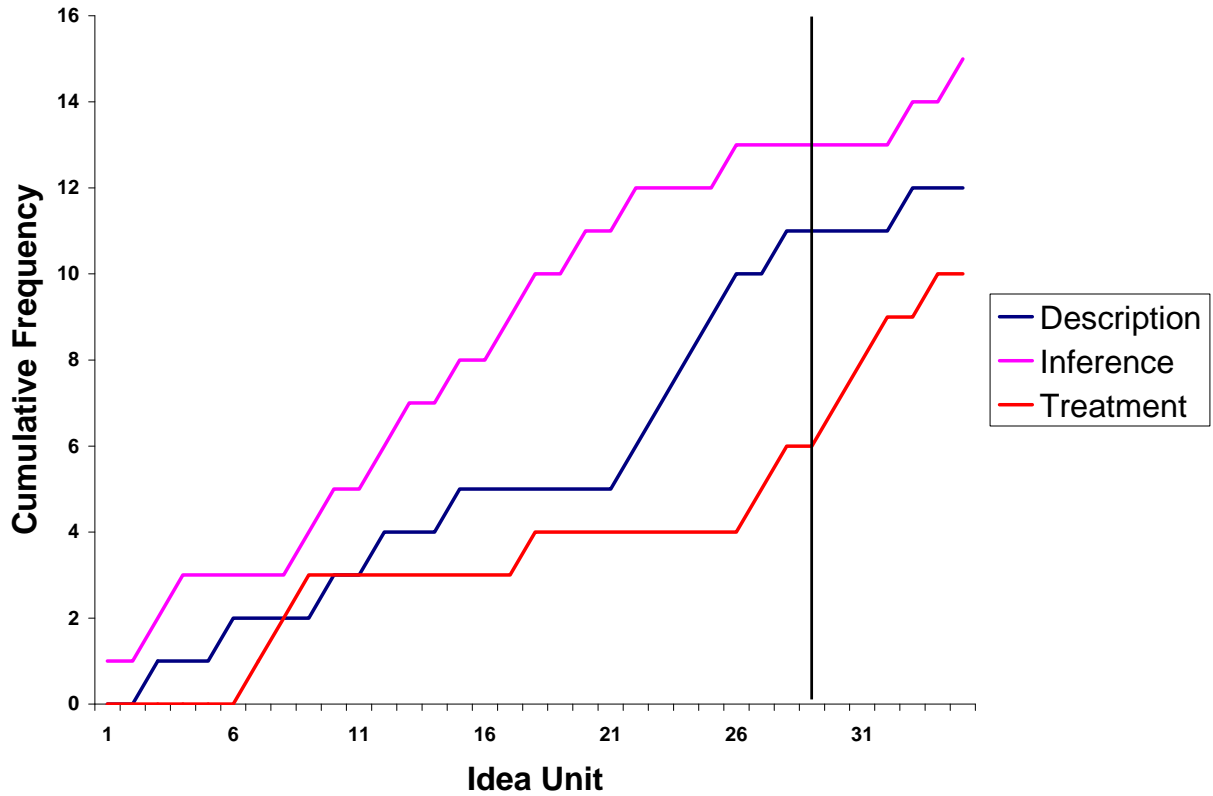
Figure 7. Cumulative Frequency Graph of Cognitive-Behavioral Formulation Rated at 25th Percentile in Overall Quality on Sharon Vignette
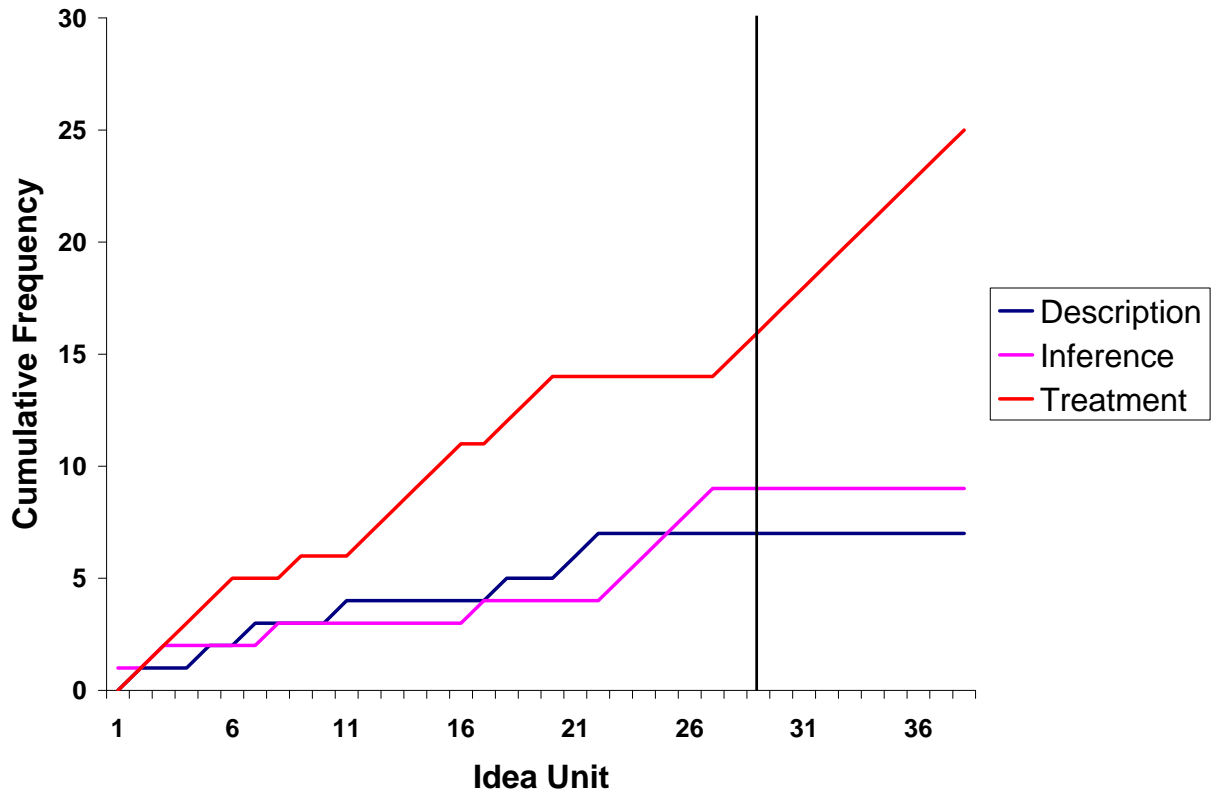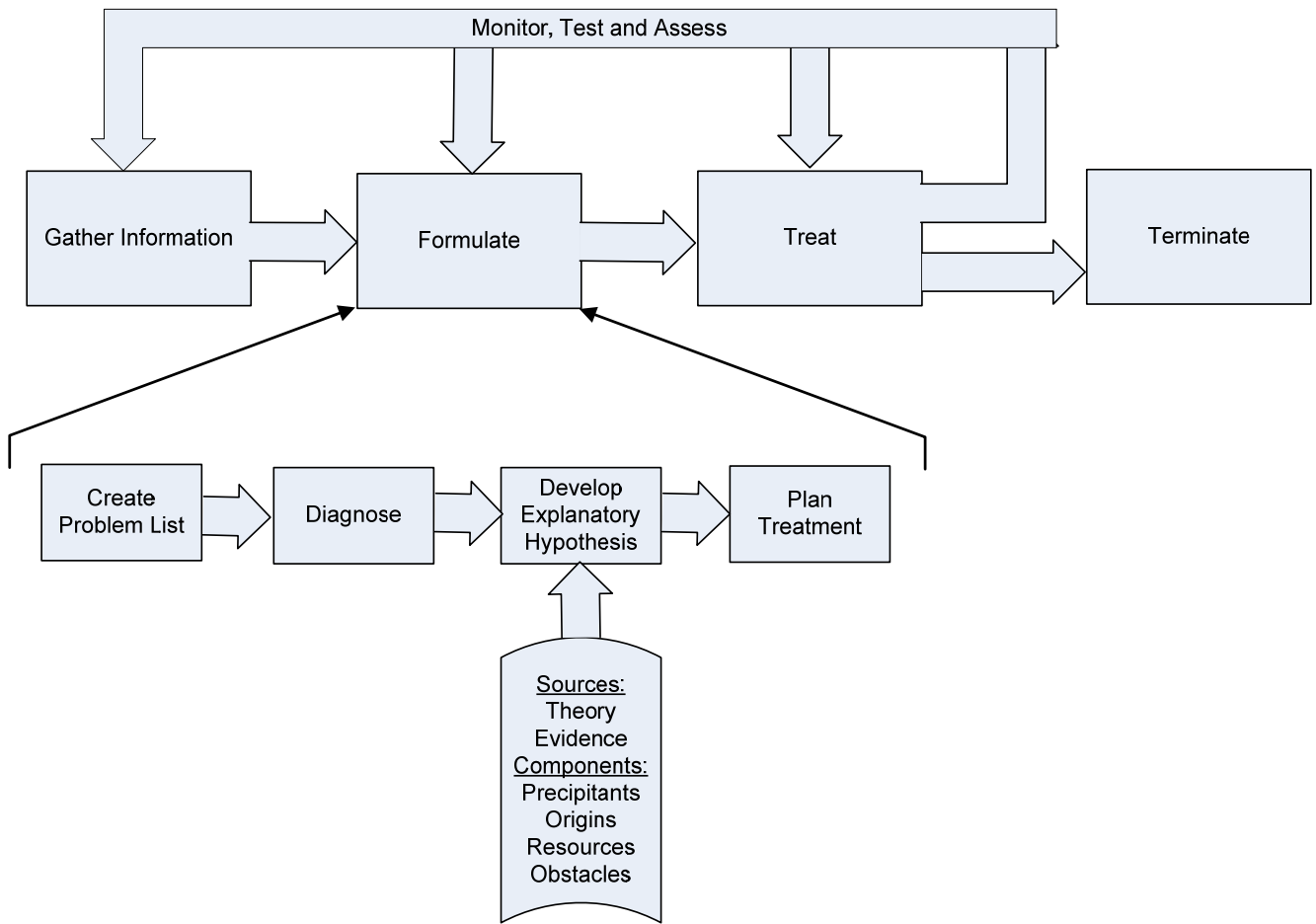
Figure 8. General Model of Case Formulation Guided Psychotherapy
(from Eells & Lombart, in press)

APPENDIX A.
CASE FORMULATION CONTENT CODING
METHOD (CFCCM): SCORING FORM

A.   DESCRIPTIVE INFORMATION (Not Presented As Explanatory)

1   Identifying Information
2   Symptom Identification (Information Given in Vignette)
3   History of Present or Previous Episode of Mental Health Problems or Care (Including Drug
     & Alcohol Abuse)
     3.1   Family history of mental health care or problems (including drug & alcohol abuse)
4   Medical / Health History – Adulthood
     4.1   Medical history in current family
5   Developmental History (Individual or Family)
6   Adult Life History (Current and Past Relationships)
7   Mental Status Information / Appearance
8   Other Descriptive Information
9   Need More Descriptive Information On: (Code as 9 if subcategory does not apply)
     9.1   Identifying information
     9.2   Symptom identification
     9.3   History of present or previous episode of mental health care or problems (include
            drug/alcohol abuse and family history of mental health care or problems)
     9.4   Medical history -- Adulthood or current family
     9.5   Developmental history (infancy through adolescence)
     9.6   Adult life history (including social and sexual history)

B.   DIAGNOSTIC INFORMATION

11   Axis I DSM-III-R or DSM-IV Diagnosis
12   Axis II DSM-III-R or DSM-IV Diagnosis
13   Axis I & Axis II Diagnosis in Same IU
14   Alcohol / Substance Abuse or Dependency

C.   FORMULATION / INFERRED INFORMATION

15   Problems in Global Psychological, Social, or Occupational Functioning
16   Symptoms / Problem Identification *Inferred* from Vignette
17   Predisposing Experiences, Events, Traumas, Stressors Inferred as Explanatory *(must be
     explicit)*
     17.1 Childhood and/or adolescence (0-18 years)
     17.2 Adulthood (past or recent and not stated as precipitant to current symptoms, which
            would be coded 18)
18   Precipitating or Current Stressors And/or Events *(primary)*
19   Inferred Mechanisms: Psychological

  19.1 Problematic aspects/traits of the self
  19.2 Problematic aspects of relatedness to others
  19.3 Dysfunctional thoughts and/or core beliefs *(not specifically self or others)*
  19.4 Affect regulation or disregulation
  19.5 Defense mechanisms / problematic coping style
  19.6 Skills or social learning deficit
20 Inferred Mechanisms: Biological
21 Inferred Mechanisms: Social or Cultural Factors
  21.1 Absence of or poor psychosocial support
  21.2 Demographic/cultural factors (e.g., SES, gender) as source of a problem
  21.3 Role conflict: role strain, role transition, role dispute
22 Strengths in Global Psychological, Social, or Occupational Functioning
  22.1 Strengths/adaptive skills, aspects, or traits of self
  22.2 Adaptive perceptions of or beliefs about others
  22.3 Positive motivation for treatment
  22.4 Adaptive wishes, hopes or goals
  22.5 Good psychosocial support
23 Identification of Potential Therapy-Interfering Events

D.   TREATMENT PLANNING

29 Type of Treatment Considered *(Code <u>only</u> when you cannot code as 32-40!)*
  29.1 Individual therapy (no specific type stated)
  29.2 Individual cognitive-behavioral therapy
  29.3 Individual psychodynamic or interpersonal therapy
  29.4 Group therapy
  29.5 Couples, marital and/or family therapy
  29.6 Inpatient psychiatric hospitalization
  29.7 Refer elsewhere for psychotherapy
  29.8 No psychotherapy recommended
30 Evaluation/Assessment (Pre-therapy, extra-therapy, or concurrent with therapy) *(Code <u>only</u> when you cannot code as 32-40!)*
  30.1 Referral for physical / general medical evaluation (not psychiatric medication evaluation)
  30.2 Referral for psychometric testing
  30.3 Further develop case conceptualization
  30.4 Ongoing use of scales to monitor symptoms, problems, progress
31 Specific (e.g., Structured) Techniques *(Code <u>only</u> when you cannot code as 32-40!)*
  31.1 Relaxation exercises
  31.2 Exposure: in vivo or in session
  31.3 Assign homework (intersession activities for patient)
  31.4 Role playing
  31.5 Provide explicit psychoeducation
  31.6 Provide explicit biopsychosocial education

FOCUS ON / EXPLORE / ATTEND TO:

32   Possible *Current* Red Flag Issues (incl. danger to self or other; suspect sexual/physical abuse or neglect; suspect organic problems; suspect drug or alcohol abuse; confidentiality or privilege issues; ethical or legal issues)

33   Treatment Contract/Expectations (e.g., length of treatment, frequency of meetings, prognosis, goals)

34   Therapist–Patient Relationship (e.g., rapport, transference, therapist-patient gender match)

35   Signs and Symptoms

36   Predisposing Experiences, Events, Traumas (Code 36 if referent is unclear)
    36.1 Childhood and/or adolescence
    36.2 Adulthood
    36.4 Precipitating or current stressors *(including current problematic relationships)*
    36.5 Past therapy relationships
    36.6 Family psychiatric history

37   Psychological Mechanisms
    37.1 Problematic aspects / traits of the self
    37.2 Problematic aspects of relatedness to others
    37.3 Dysfunctional thoughts, schemas, automatic thoughts, or core beliefs (not *specifically* self/other)
    37.4 Affect regulation or disregulation; encourage expression or control of affect
    37.5 Defenses/coping mechanisms
    37.6 Skills or social learning deficit

38   Social and/or Cultural Factors (Role Conflicts, Poor Psychosocial Support, Demographics)

39   Biological Factors / Psychopharmacology

40   Strengths in Global Psychological, Social, or Occupational Functioning

APPENDIX B:
SHARON VIGNETTE

Sharon is a 34-year-old married lawyer with a two-year-old daughter. She was referred to you by a respected male colleague after abruptly terminating therapy with the colleague, who had seen her for about six months and who tells you that the work with Sharon had appeared to go smoothly. Sharon tells you she felt her previous therapist was good, but that there were problems she felt she couldn't explore with him. She then discusses her unhappiness with her husband, who she describes as very controlling, unsupportive, and emotionally aloof. He expects her to report where she goes whenever she leaves the house. Sharon refuses to have sexual relations with her husband, does not like him to touch her, and reports that she is acting to punish him. Sharon also reports difficulty sleeping, vague feelings of dissatisfaction in herself, and a history of brief bouts of anxiety and depression that seem to dissipate within a day or two. During the interview, Sharon adds that she feels quite uncomfortable when alone and sometimes feels she is about to experience an anxiety attack.

In addition to treatment with your colleague, Sharon has been in therapy twice before. She first entered psychotherapy as a law student because she felt lonely, having moved several hundred miles from her hometown to attend law school. She also became sexually involved with a married professor. She feels this therapy was helpful, but complains that it might not have "gone deep" enough. Her next course of psychotherapy took place shortly after graduating from law school, returning to her hometown, and finding employment at a small, local law firm. Sharon explains that she felt lonely and isolated on her return, that she had no friends, and that she didn't know who she was. After a year, she met her future husband, who she said filled the void inside her, providing her with a stronger sense of who she was.

Sharon was adopted as an infant when she was just a few weeks old. Sharon describes her mother as passive. She was devoted to her father, who was a quiet, strict, hardworking man who seemed to sacrifice his own pleasures for the benefit of the family. Sharon reports that her paternal grandmother committed suicide, but she does not know the circumstances. Sharon said her childhood and adolescence were without trauma. She denies a history of sexual or physical abuse. She acknowledges a brief period of drug experimentation as an adolescent.

Sharon is animated and outgoing, but also seems tense. She is articulate and intelligent.