Cognitive-Affective Processing System Analysis of Intra-Individual Dynamics in Collaborative Therapeutic Assessment: Translating Basic Theory and Research Into Clinical Applications

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Abstract
According to the cognitive-affective processing system (CAPS) model, behavior is a function of how the distinctive cognitive-affective system of the individual responds to one’s subjective experience of the situation encountered. Thus an individual’s maladaptive coping processes may be understood by identifying the nature of the situations that a client experiences as highly stressful and the psychological reactions they trigger. An initial study established the feasibility and utility of an Internet-based CAPS daily diary program; it was then used to facilitate a clinical stress-management intervention. The daily diary enabled researchers and clinicians to gather Highly-Repeated Within-Persons (HRWP) data on the situational features, cognitions, affect, and coping behaviors associated with daily life stress, which were then analyzed separately for each participant to identify each individual’s unique and distinctive pattern of intra-individual dynamics. Results suggested that individuals differed reliably in the features of psychological situations that triggered stress and maladaptive coping behaviors. HRWP analysis of daily diary data enhanced the efficacy of clinical intervention, and clients’ self-regulatory capabilities and life satisfaction were shown to increase over the course of the intervention. We discuss how our program of research fits into the larger goals of translational science and current NIMH clinical research priorities.

From the very beginning, studies of individual differences in general, and personality psychology in particular, have grappled with the issue of behavioral consistency across situations. The fact that individuals’ behavior can vary considerably across situations (e.g., sociability, friendliness) profoundly challenged the fundamental conviction about personality as a stable characteristic of an individual (e.g., Bem & Allen, 1974; Mischel, 1968; Moskowitz, 1982; Ross & Nisbett, 1991). Intuitively, one would expect behavior to be stable across situations, yet evidence suggests otherwise.

The Cognitive Affective Processing System (CAPS) conceptualization of personality was proposed (Mischel & Shoda, 1995) to account for both the variability of a person’s behavior across situations as well as the consistency in a person’s behavior over time within a single unifying framework. According to CAPS, an individual’s cognitive, affective, and behavioral responses to a situation depend on the psychological features present in that situation (i.e., the perceptions and appraisals that are meaningful for that individual). For example, a professor who is among the most confident and self-assured lecturers in the classroom may “mysteriously” appear anxious and insecure speaking at a professional conference. Yet such variations that may at first appear surprising are not mysterious when one understands the psychological meaning of each of the situations to the individual, and the distinctive ways in which she processes information about the situation. Specifically, the CAPS model conceptualizes each individual’s mind as a network, or system, of interconnected cognitions and affects, which are activated by the psychological features contained in a given situation. The activation levels of these cognitive and affective units change as a function of changing situations and one’s previous learning experiences, but there is...
stability in how they change. It is this pattern of change in response to the specifics of the situations that reflects one’s distinctive cognitive and affective processing system.

Figure 1 illustrates the basic structure of the CAPS model using a schematic outline, a greatly simplified view of the rich system of interrelated intra- and inter-individual processes that characterize each individual (Mischel & Shoda, 1995). The large circle in the middle represents an individual’s “mind.” It contains a number of cognitive and affective units, forming a stable associative network that is distinctive for each person. These units include concepts about the self and of situations, goals and values, expectations and feelings, memories of the people and events that have been experienced, as well as behavioral scripts underlying an individual’s self-regulatory processes and the competencies for constructing externally observable behaviors (Mischel, 1973). When an individual encounters a situation, a subset of these units becomes activated, depending on the configuration of psychological features present in the situation. Activation spreads from one unit to another, following the stable associative links in the individual’s CAPS network. Activation spreads in multiple directions, often forming feedback loops. Each individual’s characteristic network among the units is expected to reflect the person’s experiences with his or her culture and subculture, as well as the individual’s specific learning history.

There are many ways in which the network is activated. For example, a situation can activate a memory of a person, which in turn can activate the memory of thoughts and feelings associated with an event that occurred in the past, further activating other memories and thoughts that lead to behaviors like crying or smiling (e.g., Andersen & Baum, 1994; Andersen & Cole, 1990). Individuals differ stably in this network of interconnections or associations, and such differences constitute a major aspect of personality (Mischel & Shoda, 1995).

To illustrate, consider a scenario in which a person is attending a play at a theater. He has seen and enjoyed countless plays before, including ones that involve murder scenes like the one before him now. But this time, it is different. He turns pale, becomes agitated, and leaves the theater. Why? What is it about this scene that is different from other plays he has seen? Is it the plot of a powerful man killed by his brother, who not only usurped the victim’s position but also married his sister-in-law? Perhaps the plot resonated and activated a vivid personal memory engraved in this theatergoer’s mind, priming associated thoughts and feelings such as jealousy and excruciating guilt.

What makes such a reaction indicative of personality is not the reaction per se, but the specificity of the situations that evoke it, in this case the person-relevant psychological features of the play that made it different from other similar plays he has enjoyed without any hint of agitation. Of course, the use of such information about individuals’ reactions to psychological features of situations is not unique to CAPS. In fact, it was already employed by William Shakespeare in the above scene...
in Hamlet over 400 years ago, in which Hamlet stages a behavioral assessment of sorts, by exposing his subject, his uncle Claudius, to a play-within-a-play scene that reenacts the murder of his father, the King (Shakespeare, 1695).

In sum, cognitions and affects that are activated at a given time depend on situations, either internal or external to an individual. The stable personality structure of the individual is found in how psychological features present in a situation relate to the cognitions and affects that are activated. The resulting distinctive patterns of if . . . then . . . contingencies between situations encountered and cognitive, affective, and behavioral reactions to them, are referred to as behavioral signatures; it is in these patterns that the individual’s personality is revealed (Shoda, Mischel, & Wright, 1994).

Research has shown that behavioral signatures are in fact stable and reflect the distinctive ways in which a person processes social information. In the years since it was first proposed, the original operationalization of behavioral signatures has been extended from behavior-in-situation counts (e.g., Shoda et al., 1994; Smith, Shoda, Cumming, & Smoll, 2009; Zakriski, Wright, & Underwood, 2005) into a more dimensional approach. Referred to as the Highly Repeated Within-Person (HRWP) approach (Shoda, 2004; Shoda & Lee-Tiernan, 2002; Whitsett & Shoda, under review; Zayas, Whitsett, Lee, Wilson, & Shoda, 2008), psychological features of situations are measured on a continuous scale, and the data can be analyzed using multilevel modeling (e.g., hierarchical linear modeling [HLM]) to assess an individual’s reactions to each situation feature. This approach also allows for multiple characteristics to be present in a single situation, and does not require categorizing situations into mutually exclusive, discrete groups. It has been used to reveal stable and meaningful behavioral signatures in people’s prosocial reactions to distress cues (Whitsett & Shoda, under review) and emotion masking (De Gere, 2008), and to show reliable individual differences in the extent to which positive and negative emotions covary within each person across different social situations (Lee, 2009). Most relevant to the focus of the present article, Wilson (2008) used this approach to characterize individuals with regard to the psychological features of situations in which they are most vulnerable to experiencing psychological stress and employing maladaptive coping behaviors. As we shall see, the HRWP paradigm inspired a clinical application within a translational research program.

The Role of CAPS Analyses in Translational Research

Clinical and personality psychology have always been closely linked (e.g., Freud’s psychoanalytic theory of personality, Rogers’s self theory, Rotter’s and Bandura’s social learning theories). However, recent years have seen an increased emphasis on translational research involving personality science and clinical psychology. In this article, we link recent developments in research on clinical assessment and cognitive-behavioral interventions using the Cognitive-Affective Processing System (CAPS) as a guiding theoretical framework. Our previous translational attempts have been primarily conceptual in nature, suggesting how a CAPS formulation could be used to understand various forms of psychopathology and to design methods for promoting therapeutic behavior change (e.g., Cervone, Shadel, Smith, & Fiori, 2006; Shoda & Smith, 2004).

The applicability of the CAPS model to clinical psychology is far from accidental. In fact, the “behavioral consistency debate” (e.g., Mischel, 1968; Bem & Allen, 1974; Mischel & Peake, 1982), which motivated the development of the CAPS model, reflected clinically oriented psychologists’ quest to conceptualize individual differences in ways that were conducive to facilitating behavioral change. Psychotherapy, in a nutshell, is behavioral change, induced by situational interventions. Thus it was felt that behavioral variability, rather than “noise” to be ignored or averaged out, contained key information about an individual’s functioning that could be fruitfully harnessed into therapeutic processes.

In short, the behavioral consistency debate was borne of a strong commitment to identifying situational cues for behavioral change. But just as strong was the recognition of profound individual differences. This led to the identification of situational cues for adaptive responses as a central goal of personality assessment.

The focus on the situations was combined with the pioneering insights of George Kelly (Kelly, 1955), as well as the “cognitive revolution” that took place in psychology during the 1970s. As a result, “situations” were conceptualized not in terms of objective, physical properties, but rather in terms of the psychological meaning they represented (e.g., Mischel, 1973). A view of psychological functioning, including maladaptive behaviors, emerged. According to this view, to understand a person required understanding how objective situational cues were encoded, construed, or interpreted by that individual. The situation as experienced by the person, in turn, triggers the person’s distinctive intra-individual cognitive and affective dynamics, culminating (in a matter of seconds, or even milliseconds) in coping behaviors that may, or may not, be adaptive. Identification of the psychological features of situations that lead to maladaptive behaviors therefore provides the basis for clinical case conceptualization.

Reflecting this history, the CAPS model is designed, from the ground up, as a model of intra-individual dynamics. For example, Figure 1 depicts how particular cognitions and affects of one individual become activated in response to different situations. The focus of this model is on how thoughts and emotions vary, within an individual, and on the regularities that characterize the pattern of change. The CAPS model also provides a framework for conceptualizing inter-individual or typological differences in terms of distinctive intra-individual patterns shared by groups of people.
This natural focus on the intra-individual dynamics of a particular person makes the CAPS model a helpful framework for conceptualizing clinical cases, as well as for planning interventions. The need for such a framework was illustrated vividly by Epstein (1994), who discussed how knowing “traits” of an automobile, that it is particularly sporty and attractive, does not help diagnose a problem it is having, not to mention repairing it. That would require knowing the parts that make up an automobile and how they are connected to each other and work as a system. That is, one needs to understand the intra-automobile dynamics and the underlying chemical-thermo-kinetic system. Given the greater complexity of human social behavior, it would not be surprising if an analysis of intra-individual dynamics and the cognitive-affective system that underlies them is even more essential for understanding the human mind.

The CAPS model provides a means of addressing two important priorities advanced by the National Institute of Mental Health (NIMH). The first is an emphasis on translational research: the application of concepts, findings, and methods derived from non-clinical areas of psychology to the understanding of dysfunctional behavior and the development of innovative treatments, together with a reciprocal focus on how knowledge of psychopathology and mechanisms of therapeutic change contributes to increased understanding of basic behavioral processes (NIMH, 2000). Clearly, many areas of psychology are relevant to clinical phenomena. For example, Tashiro and Mortensen (2006) have shown how the application of social psychological theories and research findings on the self, attitude formation, and behavior change are directly relevant to the enterprise of psychotherapy and how the application of these principles could reduce the science-practice gap that is evident in some areas of clinical practice (Baker, McFall, & Shoham, 2009; Kazdin, 2008).

A second, more recently articulated NIMH priority mandates the supplementation of group-based randomized clinical trials (RCTs) with idiographic analysis of clients: “Going forward, NIMH clinical research will not only assess overall group differences, but also individualized patterns of intervention response. The goal is a personalized approach to treatment” (NIMH, 2008). In this article, we apply, or “translate,” concepts and methods from contemporary personality psychology to the assessment and treatment of stress, using idiographic assessment and data analytic approaches to enhance our understanding of individual differences among clients. The resulting information is used to tailor an intervention that takes into account unique, individual patterns of relations among situations, cognitions, affect, and coping strategies. In the work described below, we applied the HRWP (Shoda, 2004; Zayas et al., 2008) assessment strategy to study idiographic stress and coping processes in a nonclinical population and then to move from the laboratory to the clinic by individualizing stress management training in a treatment population. In so doing, we address both NIMH priorities.

**Assessment of Idiographic Stress and Coping Processes in a Nonclinical Population**

To assess stress and coping, Wilson (2008) recruited a nonclinical sample of 13 participants to complete daily diaries in which they rated stressful situations each day. Participants also rated the situations with regard to the psychological features that were previously identified by undergraduates as being relevant for the experience of stress (Wilson, 2008). This data collection illustrates the “highly repeated” aspect of the HRWP approach to idiographic assessment.

HLM (HLMwin v 6.03; Raudenbush, Bryk, & Congdon, 2006) was utilized to extract behavioral signatures. Specifically, behavioral signatures were operationalized as predicting, for each individual separately, an outcome behavior of interest (e.g., self-reported stress) from a quantitative characterization of situations (i.e., 24 psychological features of stressful situations, each rated on 10-point scales of situational relevance). The result of the hierarchical linear modeling analysis was a set of slope coefficients for each participant that characterized how a given participant’s self-reported stress changed as a function of a given psychological feature (e.g., feeling betrayed). Therefore, each set of coefficients can be thought of as defining a behavioral signature profile.

**Stress Vulnerability Signatures**

In order to facilitate identification of psychological features of situations to which a given individual is particularly vulnerable, we plotted the stress vulnerability signatures of all 13 participants. Consistent with the CAPS model of personality, the resulting behavioral signatures were characterized by distinct shapes; some participants were particularly reactive to a given feature, while others were relatively unaffected by that same feature. While each participant’s stress vulnerability signature was unique and distinctive, one participant’s signature stood out as particularly distinctive. Figure 2a illustrates the stress vulnerability signature of “Participant 9” as well as the average across all 13 participants. The 24 psychological features of stressful situations are represented on the horizontal axis. The Level 1 slope coefficients, representing the relation between a given psychological feature and self-reported stress, are shown on the vertical axis. Figure 2a reveals that relative to other features and relative to other participants, Participant 9 was particularly vulnerable in situations characterized by feeling excluded and feeling betrayed. Therefore, the other hand, relative to other features and relative to other participants, Participant 9 was comparatively unaffected by situations characterized by feeling exhausted.

To illustrate the utility of the present approach, we also calculated mean, or average, self-reported stress across all situations. Self-reported stress across all 13 participants averaged 6.42 (SD = 2.38) on an 11-point scale (0 = not at all stressful, 10 = extremely stressful), while Participant 9’s...
average self-reported stress across all situations was 3.57. Thus, if we were to focus only on mean levels of stress, we might conclude that Participant 9 is not particularly vulnerable to stressful transactions. And while it might be that case that, on average, Participant 9 does not experience high levels of stress relative to other participants, there are particular kinds of situations to which she is especially reactive. Participant 9’s elevated stress is revealed only when we compare the magnitude of slope coefficients representing relations between specific psychological features and self-reported stress.

Figure 2a  Stress-vulnerability signatures derived from the daily diary task. Each data point corresponds to the slope representing the relation between one of the psychological features of situations (e.g., feeling excluded) and self-reported stress ratings. The two lines represent participant 9’s stress-vulnerability and the mean stress vulnerability signature (averaged across all 13 participants), respectively. Error bars represent the standard deviation associated with the mean slope for each feature. Relative to other features and to the mean stress vulnerability signature, Participant 9 reported heightened reactivity to the features feeling excluded and feeling inferior, as indicated by the magnitude of the slopes associated with those two features.

Figure 2b  Coping maladaptiveness signatures derived from the daily diary task. Each data point corresponds to the slope representing the relation between one of the psychological features of situations (e.g., feeling excluded) and the coping maladaptiveness index variable. The two lines represent participant 9’s coping maladaptiveness signature and the mean coping maladaptiveness signature (averaged across all 13 participants), respectively. Error bars represent the standard deviation associated with the mean slope for each feature. Relative to other features and to the mean coping maladaptiveness signature, Participant 9 reported increased use of maladaptive coping strategies in response to the features feeling excluded and feeling self-doubt, as indicated by the magnitude of the slopes associated with those two features.
Maladaptive Coping Signatures. What factors might contribute to Participant 9’s heightened stress reactivity to certain kinds of situations? For example, might it be the case that she was relying on ineffective strategies to cope with particular situations? On the basis of previous research on coping strategy adaptiveness (Vitaliano et al., 1990; Yi, Smith, & Vitaliano, 2005), we computed a maladaptive coping index by computing the mean extent use of four coping strategies (avoidance, blaming others, blaming self, and wishful thinking) in each situation after standardizing each coping variable within participants. We plotted Participant 9’s coping maladaptiveness signature as well as the average behavioral signature across all 13 participants. Figure 2b reveals that, relative to other participants and relative to other situations, Participant 9 reported greater reliance on maladaptive coping strategies in situations in which she felt excluded. Again, it was not the case that Participant 9 was characterized in general by a particularly maladaptive coping response across all situations. Self-reported use of maladaptive coping strategies across all 13 participants averaged 2.85 (SD = 1.13), while Participant 9’s average self-reported maladaptive coping strategy use across all diary entries was 2.22. Instead, participant 9 appears to increasingly rely on maladaptive coping strategies in situations in which she experiences heightened stress reactivity, namely situations characterized by feeling excluded.

Participant 9’s reported greater use of maladaptive coping when feeling excluded could result from increased reliance on all four maladaptive coping strategies or from increased reliance on a subset of the four maladaptive coping strategies. Results of analyses conducted for each coping behavior separately that as participant 9 felt increasingly excluded, she reported a moderate increase in blaming self ($\beta = .30$) and wishful thinking ($\beta = .38$), and an even greater increase in avoidance ($\beta = .65$) and blaming others ($\beta = .89$). For every unit increase in feeling excluded, Participant 9 reported a .89 unit increase in blaming others. Participant 9 may have been particularly sensitive to feeling excluded because she tended to cope with this stressor by using strategies that were likely to increase her sense of isolation and alienation (i.e., blaming others).

To summarize, the present approach revealed that although Participant 9 reported relatively low levels of stress reactivity on average, this participant reported experiencing heightened stress reactivity in situations in which she felt excluded. In addition, Participant 9 reported increasing reliance on maladaptive coping strategies, particularly blaming others and to a lesser extent avoidance, as situations were increasingly characterized by feeling excluded.

The present findings provide support for the feasibility, reliability, and utility of applying idiographic CAPS-based HRWP assessment to the identification of unique patterns of cognitive and affective behavioral responses in the context of stressful transactions. By utilizing the CAPS model as a framework to examine stress and coping processes in a non-clinical population, the present research is in line with NIMH’s translational research priority. But can this approach be successfully implemented in a clinical context in order to meet NIMH’s goal of assessing “individualized patterns of intervention response”? In order to examine this possibility, we applied the CAPS-based HRWP approach to an existing coping skills training intervention in order to assess client outcome and inform therapeutic understanding in a clinical context.

Clinical Application: An Enhanced Stress Management Training Intervention

Cognitive Affective Stress Management Training (C-ASMT) is a brief empirically supported coping skills training intervention that has been successfully applied to a variety of populations (Crocker, 1989; Jacobs, Smith, Fiedler, & Link, in press; Rohsenow, Smith, & Johnson, 1985; Smith & Ascough, 1984; Smith & Nye, 1989). Based on a person-situation transactional model of stress (Lazarus & Folkman, 1984), and consistent with the Cognitive-Affective Processing System (CAPS) model of personality (Mischel & Shoda, 1995) in its focus on reciprocal causal relations among situations, cognitions, affect, and behavior and its incorporation of encodings, expectancies, and self-construals in the appraisals element, this intervention combines a number of cognitive-behavioral techniques into an educational program for self-regulation of emotional responses, another of the CAPS elements. The theoretical model of stress and coping that underlies C-ASMT and the assessment instrument and intervention described in this study, as well as the interventions that are utilized to enhance coping efficacy, are shown in Figure 3. The manualized 6-session intervention targets maladaptive cognitive appraisals through cognitive restructuring and self-instructional training and physiologic responses through relaxation training and can be administered either individually, as in this study, or in a group format. As the relaxation and cognitive coping skills are

![MEDIATIONAL MODEL OF STRESS](Image)
developed, an induced affect procedure (Smith & Nye, 1989) is used to provide prolonged imaginal exposure to stressful situations in the client’s life, and the client uses relaxation and self-selected stress-reducing self-statements to reduce emotional arousal. The program ends with practice in a combined relaxation and cognitive “integrated coping response” tied into the breathing cycle that can be applied to control arousal in stressful situations.

Using HRWP Assessment to Extract Behavioral Signatures

The conceptual model in Figure 3 was used to construct a CAPS-based assessment instrument to help therapists and clients identify each client’s individualized patterns of stress-producing situational antecedents, cognitive appraisals, stress responses, and coping processes. Clients were asked to describe a stressful event experienced since their previous diary entry, try to recreate their cognitive appraisals of the situation, then rate their emotional response, their subjective experience of stress when they first encountered the stressor and after utilizing their coping strategies, the extent to which they engaged in certain coping strategies, and how effective each strategy was for them. The web-based diary program was designed to be easily customized for each participant. For example, for one client we included monitoring of a particular stress-related physical symptom. As another example, halfway through treatment, one therapist and her client decided to incorporate questions that would help the client develop stress-reducing self-statements (i.e., What is the worst possible outcome? How likely is this? How would you handle it?). A highly customizable and idiographic clinical assessment method is consistent with NIMH’s goal for “a personalized approach to treatment” (NIMH, 2008).

Four clients (hereafter referred to as A, B, C, and D) participated in the 6-week C-ASMT program enhanced with idiographic CAPS-based HRWP assessment. The clients also completed two weeks of baseline and two weeks of follow-up assessment immediately before and after treatment. Each client was treated by an advanced clinical psychology doctoral student who followed a detailed session-by-session treatment manual (Smith, 2011).

Treatment Findings

Assessing Efficacy. Idiographic HRWP assessment provided numerous measures supporting the program’s efficacy. For example, across the four clients, an HLM analysis revealed a significant ($p = .036$) decrease in post-coping stress over the course of treatment and follow-up, indicating a generalized positive treatment effect. Figure 4a shows the significant decrease in post-coping stress experienced by one of the four clients. As noted below, other, more global outcome variables, such as general life satisfaction, were also affected.

Figure 4b shows one client’s increase in life satisfaction from pretreatment baseline across treatment and follow-up. Autocorrelation-corrected time series analysis of these data using Simulation Modeling Analysis (Borckardt et al., 2008) revealed a significant increase in life satisfaction across the three phases for this client, $r(48) = .68$, $p = .009$.

In the sections below, we describe how we utilized the CAPS model as a framework for individualizing the C-ASMT intervention to each participant. We show more specifically how the CAPS-based HRWP assessment enhanced treatment by providing detailed idiographic information on each client’s stress response and coping process.

Stressor Characteristics. Clients completed web-based daily diary entries that provided qualitative and quantitative measures of the stressful events they encountered and multiple repeated measures of their stress ratings. The daily diary helped therapists identify the psychological features of stressful situations that reliably increased or decreased stress for their individual client, which were extracted from the clients’ qualitative descriptions of stressful events using a top-down approach consistent with Zayas et al. (2008). The stressful event descriptions were then independently coded and were found to be reliable among five independent raters, with kappas ranging from .42 ($p < .01$) to 1.00 ($p < .01$); mean kappa = .77 ($p < .01$).

Clients exhibited unique and distinctive behavioral signatures of stressful transactions. For example, Client A’s stress responses were most reactive to the following four psychological features: feeling time pressure (“I don’t have enough time to get everything done”), fear of negative feedback or evaluation from others (“I cannot live up to others’ expectations”), financial hardship (“I don’t have enough money to live comfortably”), and physical exhaustion (“My body can’t physically handle the stress”). When a stressful situation involved financial hardship, Client A felt less personal control over the situation ($r = -.38$, $p = .002$), which was in turn associated with higher stress levels during the stressful event ($r = -.34$, $p = .008$). The other situational features (feeling time pressure, fear of negative feedback or evaluation from others, and physical exhaustion) were not associated with personal control over the situation. It is important to note that we relied on the client’s daily reports rather than on her retrospective self-report or the therapist’s informal inferential skills to identify this pattern of associations, of which the client herself was not completely aware. This finding suggests that an intervention focused on coping specifically with financial hardship might be effective in reducing this client’s overall stress.

As described in the example above, therapists often shared the information gleaned from the daily diaries with their clients, making them both more aware of the relationships between psychological features of situations and stress. Therapists and clients could then more accurately predict which kinds of future situations would most likely lead to stress.
and help clients prepare to deal with them (i.e., anticipatory
coping). For example, after reviewing several weeks of diary
entries, Client C’s therapist noticed that her stress levels
peaked every Friday before her weekly meeting with her boss.
Based on the assumption that she would most likely experience
stress the following Friday, C and her therapist devised a pre-
emptive coping plan that C could use immediately before
going into her next meeting. Again, this cyclical pattern of
stress was not reported by the client, but was identified using
daily diary data. Once the therapist brought this information to
client C’s attention, the client said that it made sense and
resonated with her experience, but she had never taken the time
before to look for this pattern. This example also nicely illus-
trates the difference between nominal and psychological fea-
tures. “Friday” is a nominal feature, whereas “meeting with
boss/authority figure” is a psychological feature. Knowledge
of the psychological feature allowed the client to more effec-
tively engage in anticipatory coping, as the coping strategy
could be applied to any situation that involves a meeting with
or evaluation by an authority figure.

Consistent with the results described above, unique and
reliable predictors of stress emerged that differed among
clients. For example, for Client D feeling less personal control
over the stressful situation was associated with higher stress
levels ($r = -0.43, p = .002$) and feeling control over her emo-
tional reaction to the stressful situation was associated with
lower stress levels \((r = -0.45, p = .001)\), but for client B, there was no association between controllability of the situation and stress \((r = -0.10, p = .44)\) or controllability over her emotional reaction and stress \((r = -0.12, p = .39)\). Identifying these relationships and testing for statistical significance using HRWP assessment and idiographic correlational and time series analytic methods allowed the therapists to individualize the treatment by targeting only the psychological features that reliably predicted stress for their clients.

Cognition-Affect Relations. Given the strong relationship between perceived control and stress for client D, D’s therapist worked with her to understand what was underlying her sense of lack of control. In the daily diary, clients reported what they must have told themselves about the situation or themselves to trigger a stress response (i.e., stress-inducing self-statements). Based on the resulting qualitative data, it became clear that D frequently reported absolute, black-and-white appraisals of stressful situations, and this pattern of thinking was pervasive across many life areas. To help client D recognize her all-or-nothing thought patterns, her therapist printed out her online daily diary entries and had the client highlight words such as “always” and “never.” Although client D was aware of the fact that she sometimes “catastrophize” and “overgeneralize,” she was not aware of the extent to which she extrapolated from specific situations to her entire life (e.g., “This may be the only apartment that meets our qualifications; we’ll never find an affordable apartment”; “Things are always going to be this way; my husband will never have a secure job or a regular schedule”; “I’m worried that I’ll have to spend my whole life cobb[ing] together jobs to make a living, never feeling like I have financial stability or a secure career”). Understandably, absolute beliefs such as these often led client D to feel as if her future was predetermined and thus she had little control over her stress. Throughout therapy, client D’s therapist challenged the absolute nature of her appraisals to increase her sense of mastery over stressful situations. Figure 5 shows D’s ratings of situational controllability during Phase 1 (from baseline to Session 3, when cognitive coping skills were introduced) and Phase 2 (after Session 3 through follow-up). Time series analysis revealed a significant increase in the client D’s sense of control across treatment phases, \(r(49) = .40, p = .01\), and increased control was, in turn, associated with increased life satisfaction, \(r(48) = .52, p < .001\).

Stress-Coping Relations. The daily diary data also permitted an analysis of clients’ stress-coping relations. After the baseline period, Client A was presented with aggregated data showing how often she used the various coping strategies and how useful she perceived each of them to be (see Table 1). The therapist and client then discussed how some of the most effective strategies (e.g., relaxation) were used least frequently and some of the least effective strategies (i.e., self-blame and blaming others) were used most frequently. This was a powerful tool in treatment in that it allowed the client herself to discover this discrepancy between frequency of use and effectiveness of her coping strategies. In addition, while discussing why rethinking was not an effective coping strategy for A, she and the therapist realized that A was using ineffective cognitive restructuring. While A was replacing negative self-statements with positive self-statements, the positive self-statements were not believable to her, and were therefore not effective in reducing stress.

In traditional therapy not enhanced by HRWP assessment, in order to help a client discover such coping effectiveness discrepancies therapists would ask clients to retrospectively...
Table 1  Client A’s Ratings of Extent Use and Helpfulness of Various Coping Strategies

<table>
<thead>
<tr>
<th>Coping strategy</th>
<th>How often you used this strategy (days, % of total days)</th>
<th>Average perceived helpfulness in reducing your stress (1 = not at all, 6 = a great deal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxation</td>
<td>2, 18%</td>
<td>4.00</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>7, 64%</td>
<td>3.00</td>
</tr>
<tr>
<td>Social Support</td>
<td>7, 64%</td>
<td>2.86</td>
</tr>
<tr>
<td>Distraction</td>
<td>6, 55%</td>
<td>2.50</td>
</tr>
<tr>
<td>Count Blessing</td>
<td>2, 18%</td>
<td>2.50</td>
</tr>
<tr>
<td>Rethinking</td>
<td>8, 73%</td>
<td>2.37</td>
</tr>
<tr>
<td>Wishful Thinking</td>
<td>9, 82%</td>
<td>2.33</td>
</tr>
<tr>
<td>Avoidance</td>
<td>2, 18%</td>
<td>1.50</td>
</tr>
<tr>
<td>Self-Blame</td>
<td>10, 91%</td>
<td>1.00</td>
</tr>
<tr>
<td>Blaming Others</td>
<td>8, 73%</td>
<td>.86</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>0, 0%</td>
<td>n/a</td>
</tr>
</tbody>
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Data from a HRWP assessment using a web-based daily diary aided the understanding of idiographic stress and coping processes in both nonclinical and treatment populations. In the nonclinical population, unique and distinctive behavioral signatures were found for each participant, indicating that individuals differ in the psychological features that trigger stress reactions. For example, one participant reported experiencing less stress, on average, than other participants, but her stress increased dramatically, relative to other participants, in situations in which she felt excluded or inferior. If this participant were seeking treatment for stress, a general measure of stress might not capture the more extreme stress levels experienced by this participant because a critical component, namely the kind of situation, would not be available. In addition, this participant reported using maladaptive coping strategies at a similar level as other participants, but she increased her use of maladaptive coping strategies to a greater extent than others in situations in which she felt excluded. The specific behavioral signatures of stress responses and coping strategies used in each situation for this participant would be useful to examine in a treatment setting.

To extend the knowledge obtained using the HRWP assessment to a clinical population, we used the HRWP assessment to enhance an empirically supported treatment of stress: the C-ASMT. This enhancement specifically speaks to both NIMH priorities discussed earlier—translational research and an idiographic analysis of clients. The web-based daily diary assessment was used to personalize the C-ASMT program as well as to assess its effectiveness. As in the nonclinical sample, we found that there were different predictors of stress for different clients. For one client, financial hardship led to a sense of decreased personal control, which led to increased stress. For another client, stress was related to personal control over the situation as well as control over emotional reactivity, as predicted by current theoretical formulations (e.g., Aldwin, 2007; Bandura, 1997), yet no such relations were found for another client. Awareness of these individual differences allowed the therapists to truly personalize the treatment program by targeting the psychological features of situations that led to stress for each client. In addition, the baseline HRWP assessment provided therapists with substantial empirical information with regard to clients’ psychological stress and coping styles, all before the first treatment session. Analysis of these data equipped therapists with knowledge about each client’s intra-individual dynamics, and this knowledge was then shared with clients, who could clarify or provide more context, permitting a personalization of the treatment plan in a manner that is not usually attainable in time-limited interventions. These data were collected throughout therapy as well, and results from the HRWP assessment could

Use of Assessment to Facilitate New Learning. The daily diary was helpful when introducing new tools in treatment. In the C-ASMT program, therapists teach relaxation techniques, cognitive coping skills, and an integrated coping response. Both Clients A and B were periodically presented with graphs that summarized their use of cognitive restructuring and how helpful they perceived it to be in reducing stress. When asked for feedback about receiving these graphs in treatment, one client indicated that they served as motivation to increase the use of the skill because she was able to see the number of situations in which she did not use cognitive restructuring even though she knew it was helpful and typically rated it as helpful on the daily diary entries when she did use it.

Client B’s therapist also assessed the use and usefulness of the integrated coping response. In Session 5 of the training program, the therapist introduced the integrated coping response, which combines the relaxation and stress-reducing self-statements into the breathing cycle. Although the integrating coping response was rated overall as very helpful when it was used by Client B (M = 5.09, SD = 1.30), it was not very helpful the fifth time this skill was attempted (helpfulness rating was a 2 out of 6). The therapist used the daily diary to pinpoint the situations in which it was and was not an effective coping strategy, and they problem solved the different situations together, analyzing what happened, what the client told herself, and what she could have told herself as aids in understanding what went wrong on the fifth occasion this skill was attempted. After troubleshooting with the therapist using the daily diary entries as a tool, the client was able to successfully refine the use of this coping tool.

Discussion

Unfortunately, however, retrospective coping reports are notoriously unreliable (Smith, Leffingwell, & Ptacek, 1999). The advantage of using the daily diary data was that it was less biased by retrospective recall and provided strong evidence of actual discrepancies by using the client’s report of her own experience.
be presented at any point during therapy to enhance client insight, set specific coping strategy goals and assist in the refinement of coping skills.

Finally, diary data allowed for tracking of clients’ responses to the intervention, and this information was actively shared with clients. Consistent with Bandura’s (1997) focus on perceived emotional control as a potent determinant of enhanced self-efficacy, when clients were given graphs of outcome variables that demonstrated how much progress they had made in treatment, this reinforced the clients’ efforts to further master the coping skills.

Over the course of treatment, through discussion of the diary data, the therapist and client create a shared narrative about the client’s stress response. A match between clients’ understanding of their problems and the therapists’ treatment rationale is associated with better treatment outcome (Addis & Jacobson, 1996), but there are potential drawbacks to this. As with all therapies, it is possible that once a specific stress pattern is identified, the client could become hypervigilant to identifying this pattern to the exclusion of noticing other adaptive or maladaptive patterns. Therefore, both therapist and client should be vigilant to the possibility of oversensitization.

### Validity Issues in Idiographic Assessment

Assessment as described in this article involves the clinician as an idiographically oriented clinical scientist who works collaboratively with the client to select appropriate measures, collect and inspect data in the service of setting therapeutic goals, planning treatment, and evaluating treatment effectiveness. An idiographic approach to assessment, which is consistent with the CAPS meta-theory, entails the same reliability and validity issues that apply to more traditional nomothetic assessment, but they also take somewhat different forms. Aside from the largely unstudied issue of concurrence (inter-rater reliability), all aspects of validity are also relevant to idiographic assessment.

One difference between intersubject (nomothetic) and idiosyncratic assessment is that patterns of correlations and factor structures derived from intrasubject data may be different than those derived from nomothetic analyses. For example, galvanic skin response (GSR) may be an excellent indicator of somatic anxiety factor derived from idiographic analyses of individual variations, but may not be as good a measure of somatic anxiety when used nomothetically; absolute levels of galvanic skin response (GSR) may primarily reflect individual differences in skin physiology. In contrast, an idiographic analysis of the within-person variation in GSR over the course of a day may reveal a meaningful pattern of covariation with changing levels of anxiety, with those high in somatic anxiety showing such covariation to a greater degree. Even a scale-level factor structure may not hold for an individual, as when separate cognitive and somatic anxiety factors do not appear in a within-person factor analysis. As another example familiar to personality researchers, positive and negative affect have been shown to be independent dimensions in nomothetic research, but they are strongly and negatively correlated when measured idiographically at specific times in diary studies (e.g., Diener & Emmons, 1984). That is, people who experience more positive affect do not necessarily experience less negative affect, but, within each person, when a person experiences negative affect, one can be relatively sure that the person is not experiencing much positive affect in that moment. Moreover, factorial invariance across individuals suggests that the dimensional structure of a person who is used repeatedly with a given client can be assessed idiographically. Haynes, Mumma, and Pinson (2009) have suggested a measurement model that permits the importance (defined by its loading) of an item to vary across individuals. Issues of content validity are also relevant, as it is necessary to ensure that the most important constructs, test items, and causal relations are represented in the assessment, particularly when brief measures of the variables are being used. We want to ensure that the most appropriate dimensions (e.g., frequency, intensity, duration) are represented and that the outcome and causal variables are those that are most relevant to the individual case.

A collaborative therapeutic approach using idiographic HRWP assessment makes the client an active participant in this aspect of content and construct validity. For example, in the C-ASMT program, discussions with one client resulted in the addition of a new item relating to a particular physical symptom related to stress in her daily diary, and another client added new questions to help her develop more effective stress-reducing self-statements. In construct validity terms, we want to construct a client-relevant nomological net that contains the relevant constructs and valid measures of those constructs (Burns & Haynes, 2006; Cronbach & Meehl, 1955) and ensure that these measures exhibit both convergent and discriminant validity (Campbell & Fiske, 1959) for the individual client.

As in the traditional nomothetic approach to construct validity, concurrent and predictive validity are the crucible in which the value of the case formulation and the efficacy of the treatment are assessed. In the examples presented above, we observed highly individual patterns among clients in the relations among situational factors, cognition, affect, and behavior. Well-established “principles” from stress research, such as the relation between perceived personal control and subjectively experienced stress were seen in some cases, but not in others.

Incremental validity refers to the ability of an assessment result to add to the information already available, based on other information (e.g., interview, test, or anamnestic data) or nomothetically derived information on the specific disorder. Our results and those derived by other clinical investigators (e.g., Haynes & Lench, 2003) suggest that well-formulated and psychometrically sound idiographic measures can provide critically important information that facilitates both the process and outcome of clinical intervention. Individualized and longitudinally-administered measures may add incrementally to the clinically-useful information obtained on more global standardized measures such as the MMPI-2 by provid-
ing specific information on antecedent-response-consequence contingencies. Such information can help provide a more detailed case conceptualization and, hopefully, a better-informed plan of treatment. Given what appears to us to be a renewed interest in idiographic assessment in both personality and clinical psychology, this clearly is an area that invites the collaboration of personality and clinical researchers.

Future Directions

The research presented in this paper suggests that interventions using a HRWP assessment within the CAPS framework can be a useful addition to an already effective treatment such as the C-ASMT program. Moreover, as a meta-model, CAPS constructs and their interactions can potentially be applied, as in the C-ASMT intervention, as a useful heuristic for conceptualizing and understanding the mechanisms in both cognitive-behavioral treatments and in other forms of therapy, including psychodynamic treatments.

Despite its usefulness in idiographic assessment, it is important to recognize that time series analyses of individual cases would still benefit from the same causal clarity of aggregate effects that is provided by a nomothetic randomized controlled trial (RCT). Therefore, an RCT comparing a C-ASMT plus HRWP treatment program with a C-ASMT-only treatment program and a HRWP only condition would be useful to assess if the addition of the HRWP adds unique variance to treatment outcomes. In addition, the research discussed in this paper suggests that using the C-ASMT program enhanced with HRWP assessment can lead to positive outcomes in clients dealing with stress during the treatment period and within a two-week follow-up period. However, we do not yet have evidence to suggest that these outcomes have longer-lasting effects, thus there is a need for longer follow-up periods to assess the lasting impact of this enhanced intervention. Although it is expected that the HRWP could be useful to other treatment populations, such as individuals who are depressed or anxious, future research should assess the usefulness of this addition to other cognitive-behavioral treatment programs. If the HRWP is found to increase treatment effectiveness in various clinical populations, whether on its own or in conjunction with a cognitive behavioral treatment, it would be useful to develop a technology that could be easily accessible on the internet or on smart phones (e.g., Smith et al., 2011).

A well-recognized issue with traditional psychotherapy is its limited service delivery capacity (Kazdin & Blasé, 2011). Extensive reliance on expert clinicians to conduct one-on-one therapy sessions has limited its availability, mostly to those few who are fortunate enough to have personal funds or insurance coverage, and who live in metropolitan areas where most psychologists are found. Therefore, there is a great need to develop briefer, evidence-based interventions that can increase the reach of mental health providers to currently underserved populations that are suffering from psychological disorders. Technological approaches and self-help methodologies are prime candidates to respond to such needs, and Internet-based data collection will reduce geographical and socioeconomic impediment. There is considerable evidence that self-monitoring is a key ingredient of effective self-change programs as well as traditional therapeutic approaches (Beitman & Soth, 2006), and methodologies such as that used in this article can enhance the effectiveness of this therapeutic tool. Perhaps most importantly, automated analysis of data is an important next step to enable all therapists, including relatively inexperienced therapists, to benefit from the kinds of analyses that have previously been shown to provide valuable information about a client’s intra-individual dynamics.

Ongoing data collection between therapy sessions facilitated a much more efficient use of the sessions, which could otherwise have been consumed by an effort to recount and reconstruct, based on fallible memory, the problems that were the target of therapeutic intervention. Furthermore, the ongoing data collection permits the examination of mechanisms of change, the testing of clinical hypotheses with single cases as well as treatment groups, and high-quality treatment delivery (Persons, 2007).

From Quantitative Idiography to Cumulative Science

Why should psychology care about understanding a particular person? This of course is obvious to a clinician who is treating a client. But should the scientific community care about what is learned about a particular client? Does understanding a person’s psychological functioning by analyzing the pattern of his or her intra-individual dynamics contribute to science?

We suggest that the objective and quantitative analyses of each intra-individual dynamic we described above, which might be referred to as quantitative idiography, could be a key for allowing such analyses to contribute not only to the clinician’s work, but also to science in general. It is idiographic in that it focuses on understanding the functioning of one individual at a time. And it is quantitative in that it analyzes the pattern of intra-individual dynamics quantitatively. By creating an electronic repository of anonymized findings about each client’s intra-individual dynamics captured in the way illustrated in this article and as called for by Kazdin and Blasé (2011), in time common and unique ways in which different people approach life challenges will be accumulated. The accumulated knowledge can then be culled and organized through integrative, discovery-oriented, and theory-building literature reviews with a specific focus on discovering meaningful individual-to-individual variations, as well as a more qualitative “cataloguing” of the variety of processes with which different individuals address the challenge of being human, an approach some researchers already practice (e.g., Bonanno & Mancini, 2012). The result will be a cumulative science constructed with building blocks of “local knowledge” of the different ways in which individuals address life challenges.
Conducting research on the functioning of specific individuals does not necessarily mean that the results must be case studies. Perhaps there are subgroups of resilient individuals who are similar in the way they turn threats into challenges. Once such a subpopulation is identified, even if the results apply only to 5% of the population, they apply to over 15 million people in the United States alone. Furthermore, this will provide excellent bases for examining similarities and differences among individuals in their functioning. Similarities among people can be identified with regard to how they function (e.g., the temporal sequences in which particular thoughts and emotional responses are activated, guided by the pattern of associations among them), rather than overall behavioral tendencies or symptom frequencies alone. That, in turn, requires approaches that allow investigations of individual functioning. The “bottom-up” inductive process can eventually result in a taxonomy of “types” of individuals who share important commonalities that have implications not only for understanding personality dynamics, but also for applying treatment variations that engage these dynamic processes more directly and effectively.

Thus analyses of intra-individual dynamics contribute to psychological science through accumulation of systematic knowledge, such as those obtained by the HRWP paradigm, about the distinctive ways in which different individuals, or groups of individuals, address life’s challenges. Generalizability is obtained through a cumulative science rather than requiring that each published study contribute knowledge directly applicable to all individuals (Smith, 2000). And that requires that we reaffirm that science is not the endeavor of an individual, or the product of one study, but the endeavor of a collective, and the product of many studies.

Conclusion

As frequent listeners of NPR’s Car Talk program may recognize, some of the first questions the auto mechanic radio call-in show hosts ask a caller about their unhealthy car are: When does your car do this? Does it make the noise when you turn right but not left? Does it do that when the engine is cold, or hot? Does it depend on how many people are in the car? Based on the answers to these questions, they then speculate about the parts that may be faulty, and suggest an approach to fixing the problem. They are, perhaps unwittingly, practicing an idiographic, CAPS conceptualization of maladaptive automobile behavior.

Of course, that is not all they ask. In fact they usually start by asking the car model, year in which it was made, and other characteristics of the car such as the type of transmission and the number of cylinders. This makes sense because the same symptoms (e.g., a squealing sound from the front only when turning right, and only with passengers in the back seat) means different things depending on the car model. They are, again unwittingly, demonstrating an auto maintenance counterpart of cultural competence in clinical psychology, which enables clinicians to know that the seemingly same behaviors in the same situations may reflect entirely different psychological meanings to people from different cultures. They are also engaging in their counterpart of nomothetic CAPS assessment, with regard to patterns of cognitive-affective dynamics that are common among a group of individuals (e.g., different cultural or subcultural groups).

Sometimes, the radio hosts also ask questions such as “how powerful is your car? How dependable, or erratic is it?” And “is your car a gas guzzler, or a hard worker willing to go miles with tiny sips of gas?” They are engaged in the auto maintenance counterpart of global dispositional characterization, similar to the Five-Factor Model when they ask about the extent to which a characteristic applies (e.g., “how powerful”), or to the DSM when they ask callers to categorize their cars with regard to their problems (e.g., “is it a gas guzzler?”).

Which type of questions yield more useful information? We believe the answer depends on the assessment goals. For the purpose of helping an individual function better, a goal shared by clinicians and auto mechanics, then the more idiographic CAPS assessment provides information that is directly applicable, while the more nomothetic questions provide the background, giving the context in which the idiographic information can be interpreted. But if owners of the ailing cars decide to throw in the towel, and ask the radio hosts for recommendations for a new car, then it’s the nomothetic questions about the power, economy, and dependability of different models of cars that provide key answers, while the idiographic questions are yet to be relevant, until the car buyer takes ownership of a particular vehicle. Unfortunately, however, for clinicians, making recommendations for new models with better power, economy, and dependability is not a possibility (yet).

Ever since the Boulder “scientist-practitioner” model of clinical psychology was established more than half a century ago, it has been a goal of psychology to integrate science into the practice of mental health care. Thus far, that goal has been pursued primarily through therapy evaluation research, sorting what works from what does not for clients “in general.” The approach described in this article will add a second, more direct, way in which science is integrated into practice by bringing to bear a systematic and quantitative scientific tool to analyze intra-individual dynamics, helping up to create personalized treatments that are evidence-based at the level of each individual client.

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