My program of research investigates emotional and behavioral processes in romantic relationships that are related to the well-being of individual partners and to the health of the relationship. Within this broader scope, my research focuses on three related aims: 1) identifying dysfunctional processes during couple conflict, 2) studying interventions designed to reduce risk for engaging in dysfunctional processes, and 3) developing methods for assessing and characterizing couple interaction processes. I outline my work and plans for future research in these areas below.

**Dysfunctional couple conflict processes**

One of the most well replicated findings about couple interaction is that the way conflict is handled is far more important for individual and relational well-being than the occurrence of conflict itself. Although conflict is often assumed to be problematic, conflict can facilitate adaptation and is one of the primary mechanisms by which change and reorganization take place. Conversely, dysfunctional conflict processes are linked to a host of negative psychological, physical, and relational sequelae. The central premise of my research on dysfunctional conflict processes is that there are individual differences in emotional sensitivity to conflict, and that partners are motivated to reduce aversive emotional activation. However, attempts to do so often have unintended consequences that maintain dysfunctional processes and promote maladaptive outcomes. I describe theoretical and empirical bases for this hypothesis in a recent chapter on polarizing relationship processes (Baucom & Atkins, 2012) and the methodological and statistical involved in testing this and other related hypotheses in a recent manuscript (B. Baucom, Leo, Adamo, & K. Baucom, in press) and chapter (Baucom & Crenshaw, in press).

My research examines links between emotion and a specific form of behavior during couple conflict known as the demand/withdraw interaction pattern. Demand/withdraw behavior (DWB) refers to a cycle of behavior where the demander nags, criticizes, or complains in an attempt to create change, and the withdrawer quickly ends discussion or refuses to discuss change in an attempt to maintain the status quo. I focus on this specific pattern because it is one of only two forms of behavior (negative reciprocity being the other) that reliably distinguishes well-functioning couples from distressed couples; high levels of DWB are common among couples presenting for therapy, and high levels of DWB are associated with extreme forms of relationship dysfunction such as infidelity and intimate partner violence as well as adverse individual outcomes (e.g., depression, anxiety, and substance abuse).

As I describe in review chapters on marital communication (Baucom & Eldridge, 2013; Eldridge & Baucom, 2012; Leo, Leifker, D. Baucom, & B. Baucom, under review), the escape conditioning model (Gottman & Levenson, 1988) suggests that a withdrawer’s behavior is motivated by an attempt to lower his or her own aversive arousal resulting from the conflictual interaction. Although this model has strong intuitive appeal and continues to be used as a basis for intervention strategies in couple therapies, there is scant empirical support for the model. I have conducted a series of studies that are consistent with a growing body of research suggesting that the association between DWB and emotional arousal is not well characterized by the escape conditioning model. In our first study, we found demanders rather than withdrawing to be more sensitive to couple conflict (Baucom, Atkins, Eldridge, McFarland, Sevier, & Christensen, 2011). A follow-up study found that not only are demanders more sensitive to conflict than withdrawers, but also that withdrawing behavior is more strongly linked to the other partner’s emotional arousal than it is to the withdrawer’s own arousal (Baucom, Dickenson, Atkins, Baucom, Fischer, Weusthoff, Hahlweg, & Zimmerman, 2015). We integrate this collection of findings with other work on emotion and demand/withdraw behavior in our interpersonal process model of demand/withdraw behavior which proposes that demand/withdraw behavior and both partner’s emotional sensitivities are linked in a reciprocal, reinforcing cycle (Baucom et al., 2015). This model provides a new understanding
of demand/withdraw behavior and emotion, and its dyadic, cyclical perspective on the nature of the phenomenon provides a richer conceptualization and fuller description than previous models. Current and future research on dysfunctional couple conflict processes

I plan to continue developing the interpersonal model of DWB by incorporating a broader range of relationship salient emotional processes in future research. While initial empirical support for the modeling is compelling, theory and empirical evidence suggest that a number of intra- and interpersonal emotional processes, such as emotion regulation, physiological and subjective reactivity, and empathy, are likely to be involved in DWB. I am working with my graduate students on a series of studies to examine each of these processes. More specifically, I have a first authored manuscript that is currently under review as an invited resubmission that demonstrates that conflict related physiological reactivity in couple’s daily lives is much more robustly associated with a range of outcome measures than is conflict related physiological reactivity from laboratory tasks (B. Baucom et al., under review). Jasara Hogan is nearing submission of a first-authored manuscript based on her Master’s thesis that highlights the importance of every day maintenance processes in DWB and relationship distress more broadly; Alex Crenshaw has a first-authored manuscript under review based on his Master’s thesis that demonstrates that experiencing stress reduces empathic accuracy by increasing emotional arousal; Karena Leo is currently examining how subjective and expressive components of emotion interact with physiological reactivity in their association with DWB Master’s thesis; and, Colin Adamo is going to propose to conduct his Master’s thesis on physiological and perceptual qualities of relationship conflict as it occurs in daily life. Finally, I am extending the scope of my study of DWB to couples where one or both partners has significant psychological or physical health diagnoses. I am PI of a DoD-funded grant where we are examining behavioral and cognitive markers of risk in relationships for suicide in the military, and I am a co-I on grants focused on emotional and behavioral processes in conversations between breast cancer patients and their provider team that was submitted in October (PI – Matsen) as well as advanced cancer patients and their caregivers that will be re-submitted in June (Kathy Mooney, Lee Ellington, and David Wetters are co-PIs on this P01).

Interventions for dysfunctional processes

In addition to my observational work on dysfunctional interaction processes in romantic relationship, I conduct translational research aimed at developing and evaluating interventions that are grounded in well researched cognitive-behavioral models of relationship distress. The bulk of my work in this domain focuses on two couple therapies, Behavioral Marital Therapy (BMT) and Integrative Behavioral Couple Therapy (IBCT). As I describe in overview chapters written for researchers (Baucom & Christensen, 2005; Baucom, Yi, & Christensen, 2006) and clinicians (Baucom, 2011), both treatments include intervention strategies to interrupt dysfunctional behavioral processes, such as DWB, as a major component of improving overall relationship functioning despite being rooted in different etiological models of relationship distress. In contrast to the wealth of research on BMT establishing it as an empirically supported intervention for relationship distress, IBCT is a more recently developed couple therapy. My work has helped to evaluate the long-term efficacy of IBCT, to determine pre-treatment characteristics of spouses and couples associated with longer-term response to treatment and to elucidate several theoretically derived mechanisms of change. Our work suggests that IBCT is highly effective treatment for improving relationship distress and that it compares favorably with BMT for both short- and long-term outcomes (Christensen, Atkins, Baucom, & Yi, 2010). Similar to the positive effects on relationship satisfaction, my recent work finds that both IBCT and BMT result in significant decreases in demand/withdraw
behavior (K. Baucom, B., Baucom & Christensen, 2015) and emotional reactivity (Baucom, Sheng, Christensen, Georgiou, Narayanan, & Atkins, 2015). This collection of results in concert with a broader body of research strongly supports the efficacy of IBCT for improving overall marital functioning and for decreasing dysfunctional conflict processes (e.g., demand/withdraw and emotional reactivity). Building on theory suggesting that strong emotional reactivity and dysfunctional conflict processes are core components of relationship distress (Baucom & Atkins, 2012), I conducted a series of studies to evaluate whether pre-treatment levels of these processes predict long-term treatment outcomes as well as whether changes in these processes are mechanisms of change. Convergent results across several studies demonstrate that emotional reactivity is a robust predictor of response to treatment (Baucom, Atkins, Simpson, & Christensen, 2010, 2015) and that emotional reactivity (Baucom et al., 2015) is an important mechanism of change.

Current and future research on interventions for dysfunctional processes

I am advancing this line of research through three on-going, small scale IBCT studies, conducted in collaboration with Dr. Katie Baucom: 1) an effectiveness study of trainee’s ability to deliver IBCT to a wide range of treatment-seeking couples, 2) a study of IBCT as an adjunctive intervention for distressed couples where one or both partners meet(s) criteria for Metabolic Syndrome, and 3) a single case design study of a biobehavioral process model of therapeutic presence in IBCT. Importantly, each of these studies involves graduate student therapists. I am also continuing to advance this line of research by investigating couple-based interventions for psychopathology. I am a consultant on an NIMH funded R01 of a couple-based intervention of Anorexia Nervosa (AN) led by Cindy Bulik and Donald Baucom at UNC-CH and an co-Investigator on an R32 with this team on extending this work to Bulimia Nervosa. Finally, I am collaborating with Jon Abramowitz, Donald Baucom, and Melanie Fischer at UNC-CH on studies of couple-based intervention for Obsessive Compulsive Disorder (OCD). We recently published a manuscript examining emotion regulation processes in OCD and AN couples on which I am a co-author (Fischer et al., 2017). This team and I are extending this work to examine similar processes in Bulimia Nervosa through a manuscript that will be submitted by the end of the calendar year (Weber et al., in progress) as well as to Major Depressive Disorder through an R03 that was recently scored in the fundable range (PI – Fischer, I am a consultant on this grant). This collection of plans provides a spring board for extending my work on couple interventions for relationship distress to couple-based interventions for physical and mental health outcomes.

Methodological development in the assessment and characterization of interaction processes

My basic and applied research on behavioral and emotional processes is heavily reliant on measuring emotion and behavior as they occur while partners interact. Current gold standard methods for acquiring these data have produced a wealth of invaluable findings; however, these methods are also subject to a number of substantial limitations including compromised ecological validity, being time and resource intensive, and being limited in scalability. To overcome these limitations, I have developed a line of interdisciplinary research (involving collaborations with electrical engineers, computer scientists, and health informatics researchers) that applies signal processing and machine learning techniques to the study of couple interaction in both laboratory and real life settings. These efforts have produced a number of methodological and statistical advancements that not only increase the reliability, precision, and efficiency of studying couple interaction but also that open up entirely new possibilities.

One emphasis in this line of research is the application of speech signal processing techniques to the study of emotional arousal during couple interaction. Speech signal processing refers to using computer algorithms to quantify aspects of speech sound waves that communicate information, such as emotion. My work focuses on fundamental frequency (f₀), which refers to the lowest frequency
harmonic and is highly correlated with perceived pitch. Building on a series of psychometric and substantive studies (Baucom, et al., 2009, 2011, 2012a,b; in press; Kliem et al., in press; Weusthoff, Baucom, & Hahlweg, 2012), I have written methodological overview journal papers (Weusthoff, Baucom, & Hahlweg, 2013; Weusthoff, Baucom, et al., in press), book chapters (Atkins & Baucom, 2015; Baucom, 2010; Hogan & Baucom, in press), conference proceedings (Baucom & Iturralde, 2012) and newsletter articles (Baucom, 2009; Baucom, Atkins, & Christensen, 2010) and have additionally given workshops (Baucom, 2015), numerous conference presentations (e.g., Baucom, Iturralde et al., 2012), and invited addresses in the United States and Europe (Baucom, 2010, 2012a,b) to introduce couple researchers to f0 in specific as well as to speech signal processing more broadly. It has been incredibly gratifying that senior researchers from the United States (Howard Markman at the University of Denver and Rick Heyman at New York University), Europe (Kurt Hahlweg at TU-Braunschweig and Guy Bodenmann at the University of Freiburg), and Australia (Kim Hahlford at Queensland University) have sought out opportunities to collaborate with me in applying these methods to their existing data and to incorporate them into grant submissions. In partial response to these collaboration opportunities, I, along with Kurt Hahlweg and Dave Atkins, received funding from the Volkswagen Foundation to host an all expenses covered, week-long skills building workshop on signal processing and machine learning methods for 60 couple researchers and psychotherapy process researchers from around the world in summer 2014 in Heidelberg, Germany.

A second emphasis in this line of research is automating observational coding methods for quantifying partner’s behavior during interaction. This research involves developing computer algorithms that use f0 plus a wide range of additional vocal and linguistic features to predict trained raters’ observational codes (e.g., Black et al., 2011; Rozgic et al., 2010). This work makes technical contributions in the signal processing literature and opens new possibilities for the study of couple behavior during real life. As part of my University Seed Grant funded research, we collected continuous audio samples from both partners for up to 10 hours per day during their daily lives. These methods make the otherwise infeasible task of quantifying behavior during such long recordings not only possible but efficient and reliable. These methods answer calls made by couple researchers over the past two decades for developing methods to enable the study of couple interaction during real life.

A final aspect of this line of research is to extend these methods to the study of other forms of dyadic interaction such as psychotherapist-client. I have recently collaborated on projects applying these methods to the study of Motivational Interviewing with Zac Imel (Imel, Barco, Brown, Baucom et al., 2014; Soma et al., under review) and Brief Cognitive Behavioral Therapy for suicide with Craig Bryan (Bryan, Baucom, et al., under review; grants to fund replication [PI – Bryan; I am a co-I] and extension to Veterans [PI – Weisenbach; I am a co-I] are under review). Applying these methods to a range of dyadic interaction contexts provides a valuable opportunity to improve the robustness of the methods as well to test substantive questions about commonalities and unique aspects of interaction processes for different types of relationships.

Current and future research on methodological development

I am advancing this line of research through a recently funded Department of Defense grant that applies these methods to detect indicators of proximal risk for suicide in National Guard personnel; I am the PI on this grant. This study, conducted in collaboration with Craig Bryan and Eric Garland at U of Utah and Panos Georgiou and Shri Narayanan at USC, leverages technologies that Panos, Shri, and I have developed for automated analysis of laboratory behavioral samples to analyze behavioral samples collected in the lab as well as couples’ homes. We are extending our methodological work by incorporating new forms of data including psychophysiological and cognitive task data (e.g., Baucom et al., 2017).
A second area of on-going methodological development is adapting statistical methods developed elsewhere to the analysis of emotion and behavior in romantic relationships. Much of this work has focused on developing methods for the analysis of intensively measured behavioral and/or emotional data in dyads. A recent major theme in this line of research is disseminating these methods and making them accessible to applied researchers through recent manuscripts (Butner et al., in press; Perry et al., 2017) and chapters (Butner et al., in press; Butner et al., 2017). As part of these dissemination efforts, we have also created a CSBS-hosted, R-web server that allows for running the tools presented in the manuscripts and chapters using an internet form rather than having to program the analyses oneself (http://systems.psych.utah.edu/ocpu/user/psy_sys/library/VectorFields/www/plot.html). Finally, we recently received approval from the Inter-university Consortium of Political and Social Research (ICPSR) to being offering ICPSR-sponsored summer workshops that will further disseminate these ideas and techniques via workshops on dynamical systems analysis and analysis of change.

Summary

In sum, my three inter-related lines of research are each progressing and producing valuable substantive and methodological contributions. I have active projects in all three lines, have current research funding for my methodological line of research, and am pursuing additional funding for my methodological line of research. It has been highly gratifying to lead my own program of research while also having opportunities to collaborate with colleagues within and beyond psychology. I am excited about my on-going work and the plans I have to continue this work in the future.