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Naturalistic Emotion Regulation: The Measurement and Social Consequences of Spontaneous
Emotion Regulation During Marital Conflict

by

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ABSTRACT

Naturalistic Emotion Regulation: The Measurement and Social Consequences of Spontaneous Emotion Regulation During Marital Conflict

by

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Emotion regulation is arguably a social phenomenon: it occurs most frequently in the closest social relationships, serves important social functions and, correspondingly, is related to social outcomes such as relationship satisfaction. Because marriage may be the closest relationship for many adults, it is an important context in which to regulate one's emotions. However, few studies have investigated the connection between how well spouses regulate emotion and how satisfied they are with their marriages.

Using a longitudinal sample of middle-aged (40-50 years old) and older (60-70 years old) long-term married couples, I evaluated the association between couples' emotion regulation and couples' marital satisfaction, both concurrently and longitudinally over a 13-year period. The study further evaluated whether the association between couples' emotion regulation and couples' marital satisfaction differed for husbands and wives, as well as for middle-aged compared to older couples.

The present study assessed emotion regulation during naturalistic conflict interactions between married spouses. This approximates the real world context in which emotion regulation occurs, an objective that has been often overlooked in existing laboratory-based studies. Emotion regulation was assessed by examining how well couples reduced levels of negative emotional arousal (in the domains of subjective experience, behavior, and physiology) following distressing events that occurred during their interactions.

Results showed that couples' emotion regulation positively predicted couples' concurrent marital satisfaction. Specifically, shorter time spent in a negative emotional state predicted greater concurrent marital satisfaction. The effect was driven primarily by the regulation of subjective experience. Furthermore, results showed that wives' emotion regulation was more strongly related to couple's marital satisfaction than that of husbands. Additionally, there was no significant difference between middle-aged and older couples in the association between emotion regulation and marital satisfaction. In terms of longitudinal prediction, after controlling for the concurrent relationship between regulation and satisfaction, regulation did not predict change in marital satisfaction over time. Finally, a comparison of the present study's direct measures of emotion regulation and a questionnaire measure of emotion regulation revealed no correlation. However, both direct and questionnaire measures each contributed uniquely to the prediction of couples' concurrent marital satisfaction.

Findings are discussed in terms of the social functions of emotion and the nature and change over time of the marital relationship. Implications with regard to future directions of research and clinical interventions are explored.

INTRODUCTION

Emotion regulation can be defined as the ways individuals attempt to influence which emotions they have, when they have them, and how these states are experienced and expressed (Gross, 1998a). Examples of the kinds of emotion regulation that might occur in daily life include: stifling an impulse to celebrate a promotion when a spouse has been let go; staying home instead of attending a concert where crowds create fear; or hiding facial expressions of disgust to avoid offending the chef. Adult emotions are almost always regulated (Tomkins, 1984), and scientists are increasingly interested in the ways individuals attempt to regulate their emotions (Gross, 2007).

Most emotion regulation takes place in social contexts (Gross, Richards, & John, 2006) and serves important interpersonal functions. Emotion regulation influences social interactions through several mechanisms (Thompson, 1991), including the promotion of effective social behavior and interaction strategies (e.g., Langston & Cantor, 1989). Correspondingly, effective emotion regulation is related to improved social outcomes, such as closeness to others and relationship satisfaction (Gross, 2002; Gross & John, 2003; John & Gross, 2004; Lopes et al., 2005). Emotion regulation also occurs most frequently in the closest interpersonal relationships (Gross et al., 2006). Because marriage may be the closest relationship for many adults, it is an important context in which to regulate one's emotions. Although evidence supports the hypothesis that the ability to regulate emotion is characteristic of successful marriages (e.g., Gottman & Levenson, 1992; Levenson & Gottman 1983, 1985), few studies have actually investigated this issue.

The present study assessed emotion regulation using a novel methodology involving naturalistic interactions between married spouses. This methodology aims to approximate the real world context in which emotion regulation occurs, an objective that has been often overlooked in previous laboratory-based studies (Campos, Walle, Dahl, & Main, 2011). The primary hypothesis to be tested is that effective emotion regulation is associated with greater marital satisfaction. The study used a longitudinal sample of married couples in order to examine this association and the way that it changed over a 13-year period.

Defining emotion and emotion regulation

Prior to engaging in a discussion of the influence of emotion regulation on marital satisfaction, it is important to define some key terms. As LeDoux noted: "...one of the most significant things ever said about emotion may be that everyone knows what it is until they are asked to define it" (LeDoux, 1996, p. 23). Nonetheless, four core features of emotion have been emphasized in most theories of emotion. First, emotions are brief responses (Ekman, 1992) that are selected evolutionarily to aid in problem solving (c.f., Levenson, in press; Tooby & Cosmides, 1990). Second, emotion arises when an individual attends to a situation and sees it as relevant, or personally significant, to his or her goals (Clore, 1994). Third, emotion is an organizer of response systems (Lang, 1988; Levenson, 1994) that may cohere across domains of subjective experience, behavior, and physiology (Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). Fourth, emotions can be regulated (James, 1884).

As noted above, emotion regulation refers to the ways individuals attempt to influence which emotions they have, when they have them, and how these states are experienced and expressed (Gross, 1998a). Emotion regulation may result in the increase, maintenance, or decrease of one or more components of an emotional response, including behavior, physiology,

thoughts, and feelings (Gross, 1999). Decreasing the duration or intensity of distressing and, principally, negative emotions (e.g., anger, sadness, and fear) appears to be of particular importance (Gross, Richards, & John, 2006).

By definition, emotion and emotion regulation appear to be separate processes. However, there is considerable debate as to whether they are actually distinct. Some researchers have argued that emotion and emotion regulation are indistinguishable, so intertwined that all emotion is likely regulated to some extent (e.g., Campos, Frankel, & Camras, 2004; Davidson, 2000). A more balanced view of emotion regulation espouses that, although emotion and emotion regulation are closely related, attempting to distinguish between them in empirical studies is useful (Bloch, Moran, & Kring, 2009; Gross & Thompson, 2007).

What methods have been used to study emotion regulation?

Self-report versus direct measures of emotion regulation.

In self-report measures, subjects report on their own emotion regulation experiences, typically in questionnaire format. For example, the Emotion Regulation Questionnaire (Gross & John, 2003) assesses self-reported trait (i.e., enduring) measures of emotion regulation. Other questionnaires assess state (i.e., momentary) measures of emotion regulation. As an example of the latter, Egloff and colleagues (2006) had participants retrospectively rate their use of reappraisal and suppression emotion regulation strategies following a stress-induction task. Specifically, participants rated on a 6-point scale (ranging from 0 = *not at all* to 5 = *extremely*) how much they used reappraisal (e.g., “I tried to see the situation as positive as possible”) or suppression (e.g., “During the situation, I controlled my emotions”) during an evaluated speaking task. Self-reported emotion regulation has also been assessed in semi-structured interviews. For example, Gross, Richards, and John (2006) interviewed young adults about an episode in the past two weeks when they regulated their emotions. Specifically, participants were allowed to freely select a past emotion regulatory episode and then were asked a range of questions to fully elucidate the characteristics of that episode: what emotions were selected for regulation, which aspects of the emotions were targeted, whether participants were trying to up- or down-regulate, which emotion regulation strategies were used, and whether these regulatory efforts varied by social context.

In contrast to self-report measures, direct measures of emotion regulation are rooted in the assumption that emotion regulation involves changes in multiple components of the emotion response system (Gross, 1999). Specifically, direct measures assess changes in one or more components of emotional responding (i.e., physiological response, subjective experience, and expressive behavior) as indicators of emotion regulation. For example, in one of the first experimental studies of the consequences of emotion regulation, Gross and Levenson (1993) investigated the physiological, behavioral, and experiential correlates of emotional suppression. Specifically, subjects were shown a powerful emotion-eliciting film and instructed to inhibit observable expressions of emotion. During the task, subjects’ physiological responses were monitored to evaluate the physiological correlates of suppression; subjects were videotaped to enable objective coders to evaluate the behavioral correlates of suppression; and subjects were asked about their experience (on a 9-point Likert scale, ranging from 0 = *none* to 8 = *most in my life*) of 16 discrete emotions during the film to evaluate the experiential correlates of suppression.

Comparing the two approaches, self-report has the advantage of being simple to administer because all it requires is pen and paper. Among self-report measures, the interview format is particularly advantageous because it permits subjects to describe their emotion

regulation goals and activities in their own words. The disadvantage of self-report measures is that self-presentational and attribution response biases limit validity. For example, self-report data on emotion regulation may reflect subjects' beliefs about emotion and emotion regulation rather than actual emotional experiences (Gross, Carstensen, Pasupathi, Tsai, Goettestam Skorpen, & Hsu, 1997; Robinson & Clore, 2002). In contrast, direct measures of emotion regulation have the advantage of assessing actual regulation ability in terms of one or more components of the emotional response. This is particularly advantageous given that aspects of emotion regulation may occur outside of conscious awareness (Gross & Thompson, 2007).

Instructed versus non-instructed methodologies. In instructed methodologies, emotion regulation is manipulated experimentally. For example, subjects may view film clips accompanied by instructions with regard to when and how to regulate. Gross and Levenson (1993) showed participants a short film clip known to reliably elicit disgust and provided the following instruction: "...as you watch the film clip, try to behave in such a way that a person watching you would not know you were feeling anything."

In non-instructed methodologies, emotion regulation is not manipulated experimentally, but rather observed naturalistically. Studies of non-instructed emotion regulation in individuals are rare. In laboratory studies, researchers have utilized the anticipated startle response as a measure of non-instructed emotion regulation (Hagemann, Levenson, & Gross, 2006; Levenson, 2007; Levenson & Miller, 2007). In these studies, the startle (i.e., a 115 db, 100 ms burst of white noise administered through loudspeakers directly behind the patient) is preceded by a countdown. Because individuals are warned of the startle, but are not explicitly instructed to downregulate, they may or may not aim to modulate their response to the startle; this provides a good measure of non-instructed emotion regulation

Studies of non-instructed emotion regulation in dyads are even more rare. To my knowledge, no studies have utilized this methodology to explicitly examine emotion regulation in dyads. However, researchers have used this methodology to study more broadly defined regulatory processes. For example, Gottman and Levenson (1992) identified "regulated" married couples as those that exhibited a high balance of positive to negative emotional behaviors during a naturalistic conflict interaction. Comparing the two methods, instructed methodologies have the advantage of manipulating the regulation process, which enables demonstrating causal associations between emotion regulation and outcome variables of interest. An additional advantage is that all subjects receive the same regulation instructions, which focuses the scope of study by increasing consistency across subjects in the type of regulation process being measured. However, adults typically regulate their emotions without being explicitly instructed to do so (Campos et al., 2011). Therefore, a disadvantage of instructed methodologies is that they do not preserve ecological validity. Non-instructed methodologies may have greater ecological validity but are limited to demonstrating correlation, and not causation. In addition, in non-instructed studies, participants may use any of a wide range of regulatory strategies, thereby resulting in a less-focused scope of study.

Single-subject versus multiple-subject methodologies. In single-subject methodologies, subjects' emotion regulation is assessed in a solitary setting. For example, emotion elicitation in single-subject methodologies has been achieved via films (Gross, 1998a; Gross & Levenson, 1993, 1995, 1997; Shiota & Levenson, 2009), slides (Richards & Gross, 1999, 2000), and music (Tamir & Ford, 2009; Tamir, Mitchell, & Gross, 2008).

In multiple-subject methodologies,¹ emotion regulation is assessed when subjects are interacting with one or more social partners (Friedman & Miller-Herringer, 1991; Harris, 2001; Mauss et al., 2006). For example, the paradigm of Butler and colleagues (Butler, Egloff, Wilhelm, Smith, Erickson, & Gross, 2003; Richards, Butler, & Gross, 2003) involves an unscripted interaction between unacquainted female partners in which one woman is randomly assigned to regulate her emotions and the other woman is naïve to the instruction. In one study (Butler et al., 2003), two female participants viewed an upsetting documentary war film clip known to elicit high levels of negative emotion and were subsequently instructed to have a conversation about the film clip. During the conversation, one member of the dyad received instructions to “behave in such a way that your partner does not know you are feeling any emotions at all;” then, emotional experience, behavior, and physiology were assessed in both partners to determine the consequences of expressive suppression during social interaction.

Comparing the two methods, single-subject methodologies have the advantage of isolating emotion regulation processes within the individual. The disadvantage of single-subject methodologies is that they may undermine ecological validity because most emotion regulation occurs in social contexts (Gross et al., 2006) and is defined by mutual influence and interdependence (Diamond & Aspinwall, 2003).

Social functions of emotion regulation.

Emotion regulation typically occurs in social contexts and, importantly, supports the maintenance and development of adaptive social relationships (Thompson, 1991). Emotion regulation can influence social interaction through several mechanisms. First, emotion regulation promotes positive expectations for social interaction (Cunningham, 1988) and the use of effective social interaction strategies such as social extraversion (Furr & Funder, 1998; Langston & Cantor, 1989). Second, emotion regulation helps individuals avoid the negative effects of unregulated emotional expression. For example, outbursts of anger are associated with increased aggressive behavior (Bushman, Baumeister, & Phillips, 2001) and, when directed toward another person, can escalate conflict by also making the other person angry (Tavris, 1984). Finally, emotion regulation can help mitigate social rejection. For example, the unregulated expression of negative emotions may motivate others to avoid the expresser (Kowalski & Erikson, 1997).

Indeed, evidence abounds that emotion regulation is related to social outcomes. Among college students, emotion regulation abilities have been related to measures of attachment style, peer-rated likeability, sharing of emotions (Gross, 2002; Gross & John, 2003; John & Gross, 2004), social support, closeness to others, and social satisfaction (Srivastava, Tamir, McGonigal, John, & Gross, 2009), as well as self-reports and peer nominations of interpersonal sensitivity, prosocial tendencies, and reciprocal friendship (Lopes, Salovey, Cote, & Beers, 2005). In addition, emotion regulation has been related to one’s sense of authenticity in relationships. For example, individuals who chronically suppress their emotions report a sense of being inauthentic

¹ Multiple-subject research on emotion regulation among adults is sparse (Diamond & Aspinwall, 2003). In contrast, there is an extensive body of multiple-subject research on emotion regulation among mother-child dyads in the developmental literature. Early work involved naturalistic interactions between infants and mothers (e.g., Cohn & Tronick, 1988; Field, 1994; Tronick, 1989). Observations of maternal and infant emotion expressive behavior were recorded, continuously coded, and analyzed in relation to one another to determine the extent of interpersonal emotion regulation, i.e., the extent to which mother-child were sensitive and responsive to one another’s emotion signals. More recent research has extended this inquiry to mother-toddler or mother-preschooler dyads (e.g., Cole, Teti, & Zahn-Waxler, 2003; Denham, 1993; Dumas, LaFreniere, & Serketich, 1995). See reviews by Cole and colleagues (2004) and Eisenberg and colleagues (1998).

or “fake” in their social relationships (Gross & John, 2003). In studies of face-to-face interaction between strangers, instructed emotion regulation was related to reported quality of interpersonal coordination and feelings of rapport (Butler et al., 2003).

Emotion regulation in the marital context.

Given that emotion regulation plays a key role in the quality of social relationships, marriage is an important context in which to regulate one’s emotions. Surprisingly few studies have examined the link between emotion regulation and marital outcomes. Among those, Gottman and Levenson (1992) identified “regulated” couples as those that exhibited a high balance of positive to negative emotional behaviors during a 15-minute conflict interaction. Positive behaviors rated by trained coders included “neutral or positive problem description” and “humor-laugh;” negative behaviors included “escalate negative affect” and “put down.” Findings indicated that regulated couples rated their marital problems as less severe, had higher marital satisfaction, and evidenced a lower incidence of consideration of marital dissolution and of actual separation than nonregulated couples (Gottman & Levenson, 1992). In a second study of regulation during marital conflict, Levenson and Gottman examined the association between stonewalling and marital outcomes; stonewalling is an emotional behavior involving stilling the face and not giving typical listener back channels (Coan & Gottman, 2007) and is a close cousin to the emotion regulation strategy of expressive suppression. Results showed that stonewalling was related to lower marital satisfaction (Gottman & Levenson, 1988) and, in two longitudinal studies, reliably predicted divorce (Gottman 1993; 1994). Finally, Murray (2005) found support for a dependence-regulation model of close relationships in which a regulated, or chronic, feeling of positive regard from a spouse was related to long-term marital satisfaction. In sum, although the number of studies is small, effective emotion regulation appears to be related to greater marital satisfaction.

In studies reviewed thus far, emotion regulation and marital satisfaction were measured concurrently. Emotion regulation may also be related to *change* in marital satisfaction over time. However, this issue has yet to be studied.

Effects of gender and age on the association between emotion regulation and marital satisfaction.

Gender. What matters more for couples’ marital satisfaction: husbands or wives’ ability to regulate emotion? Although no studies have directly examined this research question, there are suggestions in related literature that wives’ ability to regulate emotion matters more for couples’ marital satisfaction than does husbands’ ability.

Evidence suggests that women are the “capable regulators” in marriage. For example, Ginsberg and Gottman (1986) concluded that, in interactions with close others, women are able to effectively follow negative affect with behaviors that function to preserve relationship satisfaction, whereas men cannot. Evidence also suggests that women are more responsible for regulating marital distress. For example, Ball and colleagues (1995) found that couples tend to perceive wives as more important (i.e., raising issues of disagreement, planning how to solve them, and being active in the conflict) than husbands during interactional distress. Correspondingly, Gottman and Levenson (1992) concluded that their “observations of hundreds of marital interactions over the years has led us to hypothesize that wives are much more likely than husbands to take responsibility for regulating the affective balance in marriage....” (p. 232). Taken together, evidence suggests that women are more effective at and responsible for

regulating marital distress. Thus, I hypothesize that the emotion regulation ability of wives will evidence a closer relationship with marital satisfaction than that of husbands.

Age. Are there age differences in the association between emotion regulation and marital satisfaction? To date, it does not appear that any studies have directly examined this research question. However, two related bodies of literature support the hypothesis that there is a stronger association between emotion regulation and marital satisfaction for older adults. The first body of literature indicates that older adults spend relatively more time with their spouse as opposed to friends and acquaintances (Charles & Carstensen, 2007); this suggests that the quality of time spent together will have a greater bearing on marital satisfaction. The second body of literature indicates that older individuals place increasing value on emotional goals in social relationships (Carstensen, Isaacowitz, & Charles, 1999); this suggests that emotion regulation will have a greater bearing on the quality of spousal time spent together. Taken together, this leads to the hypothesis that emotion regulation in marriage will be a greater determinant of couples' marital satisfaction in older couples.

Comparing direct measures of emotion regulation with a questionnaire measure of emotion regulation

It is useful to compare the present study's direct measures of emotion regulation with a questionnaire measure of emotion regulation. This would elucidate whether the two kinds of measures are related to each other and to marital satisfaction.

To pursue these questions, I evaluated the correlation between our direct measures of emotion regulation and a questionnaire measure of emotion regulation. Few studies have responded to the call to use multiple methods to assess emotion regulation (c.f., Cole, Martin, & Dennis, 2004). However, there is some evidence of a positive association between direct and questionnaire measures of emotion regulation (e.g., Vasilev, Crowell, Beauchaine, Mead, & Gatzke-Kopp, 2009). Thus, I hypothesized that the direct and questionnaire measures would be positively correlated. Second, I evaluated the importance of considering both direct and questionnaire measures of emotion regulation in relation to marital satisfaction outcomes. Questionnaire measures may tap beliefs about emotion regulation; in contrast, direct measures of emotion regulation may assess actual emotional responding (Gross et al., 1997; Robinson & Clore, 2002). Thus, I hypothesized that, while the two sets of measures may be positively correlated, each would also contribute unique variance in predicting marital satisfaction when modeled together.

Present study

Although marriage may be among the most important social contexts in which to regulate emotions, few studies have investigated the association between emotion regulation and marital satisfaction. The present study had three broad aims:

1. To relate couples' emotion regulation (measured at Time 1) to marital satisfaction (measured at Time 1, 2, and 3) over 13 years.
2. To determine whether the association between emotion regulation and marital satisfaction is moderated by a) gender and b) age.

3. To evaluate a) the association between direct measures of emotion regulation and a questionnaire measure of emotion regulation and b) their relationship with marital satisfaction.

The study investigated emotion regulation during conflict interactions in a longitudinal sample of middle-aged and older long-term married couples. The unique laboratory-based paradigm (see Levenson & Gottman, 1983) required couples to engage in a 15-minute discussion about an area of disagreement mutually selected by husband and wife; couples were tasked with working toward conflict resolution. Emotion regulation was assessed using objective indicators of regulation (i.e., decreased negative emotional arousal as measured by subjective experience, emotional behavior, and physiology) following highly distressing events during marital interactions (see Method section).

Compared to prior research, the present study has the following advantages: a) it assessed emotion regulation using a direct, non-instructed, interpersonal methodology that mirrors the context in which emotion regulation typically occurs and, therefore, maximizes ecological validity; b) couples were tasked with resolving a long-standing marital conflict specific to their relationship, which is a strong analogue to interactions that occur naturally outside of the lab; c) conflict interactions tend to produce high levels of emotional arousal and negative affect (Berscheid & Ammazaloroso, 2001) and, thus, many moments of identifiable distress that are likely to require emotion regulation; d) it used a sample of middle-aged and older couples, which enabled the examination of age differences in the link between emotion regulation and marital satisfaction; and e) it enabled the investigation of the relationship between emotion regulation and marital satisfaction longitudinally as couples traverse 13 years of marriage.

METHOD

Participants

The sample in this study consisted of middle-aged and older couples participating in a longitudinal study of long-term marriages (1988-2002). Recruitment procedures were designed so that the sample was representative of the demographics of the Bay Area in terms of religion, ethnicity, and socioeconomic status. Recruitment was conducted in three stages. First, a survey research company (Illini Research Center) was employed to conduct telephone surveys with women living in the Bay Area, with names selected randomly from lists of all registered voters and licensed drivers; these data were used to establish the demographics of the community. Second, potential participants were recruited through San Francisco Bay Area newspapers, flyers, posters on local buses, and radio announcements. Prospective participants completed a telephone screening to determine whether couples met the following criteria: 1) spouses were either between the ages of 40-50 and married at least 15 years or between 60-70 and married at least 35 years; 2) the age difference between spouses was not greater than five years; 3) spouses' marital satisfaction scores were within 20 points of each other; 4) the primary wage earner was not yet retired; 5) English was the native language of both spouses or the primary language spoken at home; and 6) there was no evidence of alcoholism among either spouse within couples. Third, couples were recruited from this prospective participant pool that met the demographics of the community as established based on the results of the random telephone survey. (See Levenson, Carstensen, & Gottman, 1993, for additional details of sampling and recruitment

procedures).

The final sample consisted of 156 couples (82 middle-age couples, 74 older couples). All but one couple was in their first marriage. Consistent with the demographics of the Bay Area, the ethnic distribution of the couples was primarily Caucasian (86%; 4% Black; 3% Hispanic; 3% Asian; 4% other), Protestant or Catholic (62%), relatively well-off socioeconomically, and with children (96%; one middle-aged couple was expecting their first child). Middle-aged couples were married an average of 21.7 (SD = 3.4) years; on average, husbands were 45.3 (SD = 2.9) years of age and wives were 44.8 (SD = 2.9) years of age. Older couples were married an average of 40.7 (SD = 3.6) years; on average, husbands were 64.4 (SD = 3.1) years of age and wives were 63.0 (SD = 3.3) years of age.

General Procedure

Couples were assessed a total of three times at regular intervals between 1988-2002. The present study analyzes data collected over approximately 13 years during the three study waves (Time 1: 1989/90, $n = 312$ individuals; Time 2: 1995/96, $n = 262$; Time 3: 2001/02, $n = 202$). Data collection at each time point consisted of questionnaires mailed to the home and the laboratory assessment of marital interaction.

Questionnaires. Each spouse individually completed a packet of questionnaires at home and returned packets via mail. The packet assessed (1) general demographic information, (2) physical health, (3) psychological measures and health, and (4) marital satisfaction. For the present study, only marital satisfaction and questionnaire-based emotion regulation data will be utilized.

To assess marital satisfaction during all three study waves, each spouse completed two self-report inventories: the 15-item Locke-Wallace Marital Adjustment Test (Locke & Wallace, 1959), which measures agreement between spouses in various life domains and amount of leisure time spent together, and the 22-item Locke-Williamson Marital Relationship Inventory (Burgess, Locke, & Thomes, 1971), which measures satisfaction with affection and sexuality in the marriage, overall satisfaction with the marriage, as well as areas of agreement.

To assess questionnaire-based emotion regulation during the first study wave, each spouse completed two self-report inventories: a) the Couple Communication Questionnaire (CCQ; Cowan & Cowan, 1990), which is a 41-item questionnaire designed to assess partners' level of comfort with and ability to communicate about and manage emotion in the context of relationship issues such as conflict, intimacy, and problem-solving, and b) the Emotion in Close Relationships (ECR) questionnaire, which is a 40-item questionnaire designed to assess how partners manage specific negative and positive emotions that occur in the context of their relationship.²

Laboratory Assessment. The procedures employed in this study were derived from those developed by Levenson and Gottman (1983). At each study wave, couples participated in two laboratory sessions. In the first session, couples visited the laboratory together after not having spoken to each other for at least 8 hours. They had recording devices attached for obtaining physiological measures (see below). Couples then engaged in three conversations: (a) events of the day—a general discussion of what had happened in the past day; (b) conflict—a mutually selected area of continuing disagreement in their relationship; and (c) positive—a mutually

² The CCQ and ECR questionnaires were available as part of the present study. Given that the study did not include a scale that was explicitly designed to measure emotion regulation, suitable items from the CCQ and ECR were agglomerated to derive an Emotion Regulation Scale.

selected pleasant topic. Prior to initiating the conflict area discussion, couples completed the Couple's Problem Inventory (Gottman, Markman, & Notarius, 1977) in which they rated the perceived severity of 10 relationship issues on a 0-to-100 scale. They were also given the option of writing in and rating additional topics that were not on the list. Using these ratings, an experimenter helped couples pick a topic that both spouses had rated highly. The experimenter briefly interviewed the spouses about the topic, and helped them focus on the key area of disagreement in order to make the ensuing discussion more personal and less abstract. Each conversation lasted 15 minutes and was preceded by a five-minute silent period. Given the aims of the present study, only data from the conflict area discussion during the first study wave were utilized. The rationale for selecting the conflict discussion is that conflict produces a high level of negative emotional arousal that is likely to require emotion regulation (Berscheid & Ammazzalorso, 2001).

During the silent periods and conversations, a broad sample of physiological measures was obtained and a video recording was made of the interactions. The video recording was made using two partially concealed, remotely controlled video cameras. The videos captured frontal views of each spouse's face and upper torso; images were combined into a single split-screen image using a video special effects generator and were recorded on a VHS videocassette recorder. Two lavalier microphones were used to record the couples' conversations.

Several days later, couples returned to the laboratory for a second session. Spouses individually watched the videotapes of all three conversations and were instructed to use a rating dial to provide continuous ratings of their own feelings during the original interaction (evidence for the validity of this procedure was presented in Gottman & Levenson, 1985). The dial consisted of a rotary knob with a pointer that covered a 180-degree arc over a 9-point scale ranging from "extremely negative" (1) to "neutral" (5) to "extremely positive" (9). After rating all three conversations in this manner, spouses watched the conflict conversation a second time with the instruction to adjust the dial so that it indicated how they thought their spouse was feeling during the original interaction. For the present study, only spousal ratings of his or her own emotions were used.

Laboratory Measures

Self-Reported Affect. Following procedures used in earlier studies (Levenson & Gottman, 1983), self-reported affect scores were computed using the rating dial data from the couple's second laboratory visit. In this session, spouses were asked to provide continuous ratings of their own feelings during the original interaction. The rating dial position was sampled by computer 100 times per second and averaged every second.

Emotional Behavior. Emotional behaviors were determined by observational coding of videotapes of the interaction using the Specific Affect coding system (SPAFF Version 2.0; Gottman, 1989). Trained coders viewed the videotaped interactions and rated the emotional behaviors of each spouse, taking into account verbal content, voice tone, context, facial expression, gestures, and body movements. Codes were generated on a second-by-second basis. For speakers, there were five positive speaker codes (interest, affection, humor, validation of partner's feelings, or joy), nine negative speaker codes (anger, contempt, disgust, belligerence, domineering, defensiveness, fear/tension/worry, sadness, or whining), and a neutral speaker code indicating that no affective behavior was present. Listener codes were also assigned each second (positive, negative, neutral, or stonewalling); however, these codes were not used in the present study. Reliability of the SPAFF coding was determined using Cohen's kappa, which controls for agreement by chance (Bakeman & Gottman, 1986). For speaker codes, the kappa was .60, $z =$

15.02, $p < .001$, suggesting high agreement. This reliability value is comparable to those typically reported for SPAFF coding (Coan & Gottman, 2007).

Physiology. Continuous recordings of seven physiological measures were obtained from each spouse using a Grass Model 7 12-channel polygraph and a computer: (1) cardiac interbeat interval (IBI)—Beckman miniature electrodes with Redux paste were placed in a bipolar configuration on opposite sides of the subject's chest and the interval between successive R-waves of the electrocardiogram (EKG) was measured in milliseconds (ms); (2) skin conductance level—a constant voltage device passed a small voltage between Beckman regular electrodes attached to the palmar surface of the middle phalanges of the first and third fingers of the nondominant hand using sodium chloride in Unibase as the electrolyte; (3) finger temperature—a Yellow Springs Instruments thermistor was attached to the palmar surface of the first phalange of the middle finger of the dominant hand with surgical tape; (4) pulse transmission time to the finger—a UFI photoplethysmograph was attached to the second finger of the nondominant hand. The time interval was measured between the R-wave of the EKG and the upstroke of the peripheral pulse at the finger; (5) finger pulse amplitude—the trough-to-peak amplitude of the finger pulse was measured, providing an index of the amount of blood in the periphery; (6) pulse transmission time to the ear—a UFI photoplethysmograph attached to the right earlobe recorded the volume of blood in the ear. The time interval was measured between the R-wave of the EKG and the upstroke of the peripheral pulse at the ear; and (7) general somatic activity—an electromechanical transducer attached to a platform under the subject's chair generated an electrical signal proportional to the amount of body movement in any direction. A computer program written by Robert W. Levenson was used to calculate second-by-second averages for each physiological measure for each spouse.

Physiological measures were selected to sample broadly from major organ systems (i.e., cardiac, vascular, thermoregulatory, electrodermal, somatic muscle), to allow for continuous measurement, to be as unobtrusive as possible, and to include measures used in previous studies of marriage (e.g., Levenson & Gottman, 1983) and emotion (e.g., Fredrickson & Levenson, 1998).

Data Reduction

Questionnaires

Marital Satisfaction. Consistent with our previous research (e.g., Levenson, Carstensen, & Gottman, 1993), each spouse's marital satisfaction was determined by averaging the two inventories (Locke-Wallace Marital Adjustment Test and Locke-Williamson Marital Relationship Inventory) to ensure broad coverage of the marital satisfaction construct and enhance reliability. For each couple, the average of both spouses' scores on these measures was calculated as an index of the couple's overall marital satisfaction. At the first study wave, couple marital satisfaction scores ranged between 45 and 138, with a mean of 111.26 ($SD = 16.19$). Consistent with the fact that these were long-term marriages, the mean satisfaction level was higher than the population norm (approximately 100), but still included a wide range of marital satisfaction levels. Middle-aged couples had an average marital satisfaction score of 109 ($SD = 16.0$), and older couples had an average score of 114 ($SD = 15.9$). Appendix A provides marital satisfaction scores for the sample across the three study waves.

Questionnaire Measure of Emotion Regulation. Each spouse's emotion regulation was determined by combining items from the two inventories (Couple Communication Questionnaire and Emotion in Close Relationships questionnaire). Specifically, 19 items (four from the Couple

Communication Questionnaire; 15 from the Emotion in Close Relationships questionnaire) were selected as items related to emotion regulation (See Table G). Each spouse's questionnaire measure of emotion regulation was determined by summing scores on these 19 items (reverse scored where indicated) to ensure broad coverage of the emotion regulation construct and enhance reliability. For each couple, both spouses' questionnaire-based emotion regulation indices were averaged to compute the couple's overall questionnaire measure of emotion regulation. These indices showed satisfactory internal consistency at the couple level ($\alpha = .95$), for wives ($\alpha = .94$), and for husbands ($\alpha = .92$).

Laboratory Measures

Self-reported Affect. The computer was programmed to derive second-by-second averages for each spouse's rating dial data. The second-by-second averages were converted into z-scores using the mean and standard deviation of each spouse's ratings across the entire 15-minute conversation. The z-scores were reverse scored so that larger values reflected more negative self-reported affect.

Emotion Behavior. Second-by-second SPAFF codes were generated by trained coders as described above. Each second was assigned a dummy code of "1" if a negative emotion behavior is present and "0" if a negative emotion behavior was not present. (See Appendix B for a description of all nine negative emotion behaviors).

Physiology. The computer was programmed to derive second-by-second averages for each physiological measure for each spouse. The second-by-second averages were converted into z-scores using the mean and standard deviation of each spouse's physiological measures across the entire 15-minute conversation. The z-scores were reverse scored as needed (i.e., cardiac inter-beat interval, finger pulse amplitude, finger pulse transmission time, ear pulse transmission time, and temperature) so that larger values reflected greater physiological arousal.

In addition to computing z-scores for each physiological measure, z-scores for each measure were combined to compute a second-by-second composite measure of physiological activation. This kind of physiological composite is common in emotion research (e.g., Gross & Levenson, 1997; Mauss et al., 2005). It provides a single measure sensitive to both sympathetic and parasympathetic neural influences as well as electrodermal, somatic, and both cardiac and vascular responses. Significant findings involving physiological composite scores were subjected to follow-up analyses to determine the contribution of individual physiological measures.

Operationalizing emotion regulation - Rationale

The present study investigated emotion regulation during marital conflict, which produces a high level of negative emotional arousal that is likely to require emotion regulation (Berscheid & Ammazzalorso, 2001). In this context, greater emotion regulation involves decreasing the intensity of negative emotional arousal (Gross, Richards, & John, 2006; Snyder & Stukas, 1999). The goal of the present study was to a) identify highly negative emotion events during marital conflict and b) assess subsequent emotion regulation, indicated by a decrease in negative emotional arousal. As noted earlier, it is profitable to assess emotional arousal using a multi-method approach – i.e., emotional arousal as measured by subjective experience, emotional behavior, and physiology.

I evaluated this decrease in negative emotional arousal by two distinct measures, consistent with the understanding that emotion regulation may be reflected in changes in a) emotional intensity or b) time course (Thompson, 1994). The first measure evaluated the overall

magnitude of decline in arousal (i.e., emotional intensity) following a highly negative emotion event. In this measure, more effective emotion regulation was reflected in a larger magnitude of decline in arousal during a fixed (i.e., 10-second) time interval after the emotion event. The second measure evaluated the *duration* of time (i.e., time course) required to decrease sufficiently in arousal following a highly negative emotion event. In this measure, more effective emotion regulation was reflected in a shorter duration of time required to decrease in arousal beyond the ‘highly negative’ threshold.

Notably, the identification of highly negative emotion events and the assessment of subsequent emotion regulation were evaluated at the level of the couple. This was consistent with the rationale that emotion regulation in marital dyads is not isolated within individual spouses, but rather is defined by mutual influence and interdependence. Social proximity and interaction are thought to facilitate emotion regulation beginning in infancy and extending through adulthood (Bowlby, 1973; Mikulincer, Shaver, & Pereg, 2003; Sbarra & Hazan, 2008). It is thought that the mutual influence associated with emotion regulation needs (i.e., co-regulation) is most acute in couple relationships (Coan, 2008). Therefore, it follows that emotion regulation should be studied at the level of the dyad to capture this mutual influence (Diamond & Aspinwall, 2003).

Operationalizing emotion regulation – Methodology

Identifying negative emotion events. Negative emotion events were identified for each spouse as a period of 5 consecutive seconds³ in which 2 of the 3 components of the emotional response system (physiology, experience, and behavior) reflected high negative arousal. The specific criteria for high negative arousal were as follows: 1) physiological measures: z-scores were greater than or equal to 1.0 for at least 3 measures; 2) self-reported affect: z-scores were greater than or equal to 1.0 (reverse-scored); 3) emotion behavior: negative emotion behavior was present. For each couple, negative emotion events were tallied when they occurred in either spouse. Couples may have had more than one negative emotion event during their interaction. Preliminary analyses revealed that using these criteria resulted in 140 of 156 couples with at least 1 negative emotion event. Couples with no negative emotion event were excluded from analyses.

Assessing emotion regulation: Magnitude.

Specific variables: For each spouse, I computed an emotional arousal score – separately for physiology, experience, and behavior – by computing that spouse’s average arousal *during each 5-second negative emotion event* within the couple interaction. In addition, for each spouse I used the same method to compute an emotional arousal score based on the *10-second period immediately following each negative emotion event* within the couple interaction.

Then, a difference score between the measure of each spouse’s emotional arousal *during* the negative emotion event and during the period *following* the event was calculated separately for physiology, experience, and behavior. This difference score indicated *emotion regulation*. Regulation was reflected in a score reflecting downregulation: less physiological arousal, less negative subjective experience, and less negative emotional behavior during the period following the negative emotion event.⁴

³ The 5-second cut-off window was adopted in an effort to isolate single emotion events, and is derived from the Ekman (1992) definition of emotion, which asserts that a single emotion event is a brief response that may last from 3-10 seconds.

⁴ This methodology attempted to distinguish between emotion and emotion regulation (c.f., Gross & Thompson, 2007). First, the onset of emotion events necessarily followed a period that *did not* meet criteria for an emotion

When there was more than one negative emotion event during a given couple interaction, the difference scores derived for each negative emotion event were averaged to produce a final emotion regulation score. Ultimately, each spouse was assigned one *magnitude emotion regulation* score for physiology, one for experience, and one for behavior.

For each couple, a magnitude emotion regulation score was calculated – separately for physiology, experience, and behavior – by averaging husband and wife magnitude emotion regulation scores across each of those components.

Composite: For each spouse, magnitude emotion regulation scores for physiology, experience, and behavior were z-scored and then averaged to compute a composite magnitude emotion regulation score. For each couple, a composite magnitude emotion regulation score was then calculated by averaging husband and wife composite scores.

Assessing emotion regulation: Duration.

Specific variables: For each spouse, immediately following each negative emotion event I computed the number of consecutive seconds – separately for physiology, experience, and behavior – that the spouse continued to evidence high negative arousal. As described earlier, the specific criteria for high negative arousal were as follows: 1) physiological measures: z-scores were greater than or equal to 1.0 for at least 3 measures; 2) self-reported affect: z-scores were greater than or equal to 1.0 (reverse-scored); 3) emotion behavior: negative emotion behavior was present.

This duration (in consecutive seconds) of high negative arousal – calculated separately for physiology, experience, and behavior – indicated *emotion regulation*. Regulation was reflected in a shorter duration of high physiological arousal, shorter duration of negative subjective experience, and shorter duration of negative emotional behavior during the period following the negative emotion event.

When there was more than one negative emotion event during a given couple interaction, the duration scores derived for each event were averaged to produce a final emotion regulation score. Ultimately, each spouse was assigned one *duration emotion regulation score* for physiology, one for experience, and one for behavior.

For each couple, a duration emotion regulation score was then calculated – separately for physiology, experience, and behavior – by averaging husband and wife duration emotion regulation scores across each of those components.

Composite: For each spouse, immediately following each negative emotion event I computed the number of consecutive seconds that the spouse continued to evidence diffuse high negative arousal (as defined previously in regard to criteria for negative emotion events: 2 of the 3 components of the emotional response system, i.e., physiology, experience, and behavior, reflected high negative arousal). A shorter duration (in consecutive seconds) of diffuse high negative arousal indicated emotion regulation.

For each couple, a composite duration emotion regulation score was then calculated by averaging husband and wife composite scores.

All duration variables were reverse scored so that higher values reflected greater emotion regulation.

event. Then, the 10-second period immediately following the emotion event was utilized to measure emotion regulation. This avoided confusing the distinction between emotion and emotion regulation because of the discrete onset of an emotion event, which was followed by a discrete period in which to assess regulation. Thus, this methodology provided a strong basis for inferring that an emotional state was activated and that regulatory processes occurred independently.

Qualitative Component – An Exploratory Analysis

A qualitative component was included to further elaborate on the characteristics of marital interactions of couples demonstrating greater and lesser emotion regulation, based upon the results of the present study.

Qualitative analyses were designed to be exploratory and illustrative. Quantitative analyses would reveal the nature of the association between emotion regulation and marital satisfaction. Then, couples demonstrating greater and lesser emotion regulation would be identified based on the five couples with the highest and lowest emotion regulation scores, respectively, as indicated by results of the primary analyses.

The videotaped recordings of the ten conflict interactions (five couples demonstrating greater regulation and five couples demonstrating lesser regulation) would be viewed. A qualitative examination of the marital interactions would be conducted, in which content of speech, voice tone, paralinguistic behaviors, and other observations would be made. Then, qualitative observations of couples demonstrating greater versus lesser emotion regulation would be reported and compared.

Notably, primary analyses were designed to assess the brief windows of time following negative emotion events during which I anticipated emotion regulation to occur; as described earlier, the brief windows of time were observed, coded, and analyzed quantitatively. Thus, as a complement to the quantitative analyses, these qualitative observations were intended to provide a *gestalt* of couples with greater versus lesser emotion regulation. Accordingly, qualitative observations were intentionally broad-based.

General Analytic Approach

I used latent growth curve modeling (LGM) within a structural equation modeling framework (e.g., Duncan & Duncan, 2004; McArdle & Epstein, 1987) to examine the hypotheses of this study. LGM is a statistical technique that models both individual change and interindividual differences in change with respect to a construct measured repeatedly over time. The LGM approach is advantageous in light of its flexibility in modeling change. LGM enables modeling the effect of predictors on the intercept and the slope of an outcome, simultaneously. The intercept and slope factors are always covaried in LGM to account for possible non-independence. Additionally, the intercept and slope are latent, as opposed to manifest or observed, variables; thus, LGM yields the advantage of analyzing effects on latent, and therefore error-free, variables. LGM also allows for modeling linear as well as non-linear growth curves, which is advantageous given that change in many aspects of psychological functioning is not necessarily linear. Finally, multiple predictors of change can be included in LGM. The reader is referred to a number of sources (c.f., Byrne & Crombie, 2003; Willett & Sayer, 1994) that have provided a detailed discussion of the advantages of LGM.

Analyses were conducted using AMOS (version 5; Arbuckle, 2003) and a Full Information Maximum Likelihood (FIML) algorithm to estimate missing data. The χ^2 statistic, the comparative fit index (CFI; Bentler, 1990), and the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) were utilized as indicators of model fit. The CFI ranges in value from 0 to 1.00, with a value of .95 serving as the cutoff point of acceptable fit. For the

RMSEA, values less than .06 indicate good fit, while values as high as .08 represent reasonable fit (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004).

RESULTS

Preliminary Analyses

Correlations among Emotion Regulation and Marital Satisfaction Variables

Correlations were examined among couples' emotion regulation (i.e., magnitude and duration) and couples' marital satisfaction, which is the outcome variable of interest in the present study (Table A).

Variables indicating magnitude and duration of emotion regulation were positively correlated. For example, greater couples' magnitude of emotion regulation (composite) was associated with greater couples' duration of emotion regulation (composite) ($r = .43, p < .001$). A similar relationship was found for couples' magnitude and duration of emotion regulation (behavior) ($r = .48, p < .001$). The significant but not overly high correlations between the magnitude and duration regulation variables provided evidence that they are related but distinct measures of emotion regulation.

As expected, an examination of associations *within* magnitude and duration emotion regulation variables indicated that the composite variables were positively correlated with all three component variables, i.e., experience, behavior, and physiology variables. For example, greater couples' magnitude of emotion regulation (composite) was associated with greater couples' magnitude of emotion regulation for experience ($r = .56, p < .001$), behavior ($r = .57, p < .001$), and physiology ($r = .48, p < .001$). Moreover, there was a general trend toward non-significant associations among experience, behavior, and physiology regulation variables. For example, couples' duration of emotion regulation (experience) was not significantly associated with couples' duration of emotion regulation (physiology) ($r = -.19, p = .19$). Indeed, weak associations among experience, behavior, and physiology emotion regulation variables are expected, as emotion regulation may involve unique changes in different components of the emotional response system (e.g., Gross & Levenson, 1993, 1997; Shiota & Levenson, 2009).

Marital satisfaction variables were highly positively correlated over time. That is, couples' marital satisfaction at Time 1 was strongly correlated with couples' marital satisfaction at Time 2 ($r = .86, p < .001$) and Time 3 ($r = .87, p < .001$). This shows substantial but not perfect stability of marital satisfaction over time. As shown below, interindividual differences in intraindividual change over time in marital satisfaction were revealed using LGM.

Correlations between Marital Satisfaction and Covariates

Correlations were examined among couples' marital satisfaction and variables that were hypothesized to have a unique relationship with marital satisfaction: a) number of negative emotion events and b) arousal during events. Relationships between marital satisfaction and the frequency and level of arousal of negative emotional behavior, negative subjective experience, and high physiological arousal during conflict have been reported (Gottman & Levenson, 1992; Levenson & Gottman, 1985). Thus, it was important to test for the relationship between a) marital satisfaction and number of emotion events, which is a composite score reflecting the

frequency of negative emotional behavior, experience, and physiology, and b) marital satisfaction and level of emotional arousal during negative emotion events.

(a) Number of negative emotion events: A *greater* number of negative events at Time 1 was related to *lower* marital satisfaction at Time 1 ($r = -.22, p = .01$) and the relationships were in the expected direction (although not significant) at Time 2 ($r = -.14, p = .13$) and Time 3 ($r = -.15, p = .15$). Therefore, all subsequent analyses covaried for the number of negative emotion events.

There were no age differences in the number of negative emotion events ($t = .45, p = .65$). Additionally, there were no gender differences ($t = -1.32, p = .19$), although the trend was in the expected direction wherein the number of negative emotion events was greater for wives than for husbands.

(b) Arousal during negative emotion events: *Greater* arousal during negative emotion events at Time 1 was related to *lower* marital satisfaction at Time 3 ($r = -.22, p = .04$) and the relationships were in the expected direction (although not significant) at Time 1 ($r = -.15, p = .10$) and Time 2 ($r = -.07, p = .49$). There were no age ($t = 1.19, p = .24$) or gender differences ($t = -.08, p = .94$) in arousal during negative emotion events.

In summary, these analyses indicated that both the number of emotion events and the level of emotional arousal during negative events were related to marital satisfaction. For this reason, both variables were included as covariates in the following analyses.⁵ (See Table B for the distribution of negative emotion events and the distribution of arousal during negative emotion events.)

Gender and Age Differences in Emotion Regulation

Table C presents descriptive statistics for all emotion regulation variables. Moreover, gender (Table D) and age (Table E) differences in magnitude and duration emotion regulation variables were examined utilizing analysis of variance (ANOVA). Two age differences emerged: older adults demonstrated lesser emotion regulation than middle-aged adults with respect to regulating the magnitude of their negative emotional experience, $F(1, 274) = 5.87, p = .02$, and the duration of their negative emotional experience, $F(1, 252) = 4.49, p = .04$. An interaction effect of age by gender also emerged: wives demonstrated greater, and husbands demonstrated lesser, emotion regulation of the magnitude of their physiological arousal with greater age, $F(1, 269) = 9.96, p = .002$. No other gender differences emerged.

Follow-up analyses were conducted with analysis of covariance (ANCOVA), controlling for a number of covariates including couple marital satisfaction, number of negative events, and arousal during events. With regard to age differences, ANCOVA analyses indicated that age was no longer associated with the magnitude of regulation of experience, $F = 2.09, n.s.$ Additionally, the interaction effect of age by gender on the magnitude of regulation of physiology was no longer significant, $F = 2.95, n.s.$ However, ANCOVA analyses yielded a significant main effect for age in predicting the duration of regulation of experience. Thus, older adults demonstrated lesser emotion regulation than middle-aged adults with respect to regulating the duration of their negative emotional experience even when controlling for covariates, $F(1, 239) = 5.72, p = .02$.

Deriving an Adequate Univariate LGM for Marital Satisfaction

⁵ Notably, all results remained stable when covariates were not controlled for.

Preliminary analyses involved deriving an adequate univariate LGM for marital satisfaction. An adequate model would be reflected in CFI values $> .95$ and RMSEA values $< .06$. To test whether the data were best described by linear or non-linear growth, two models were compared. In the linear model, factor loadings for the slope factor were assigned values corresponding to a linear time scale (0, 1, 2). In the non-linear model, constraints on linear growth were relaxed: the first and last factor loadings of the slope factor were fixed to 0 and 1, respectively, and the second factor loading was freely estimated (Meredith and Tisak, 1990). Differences in goodness-of-fit statistics enabled concluding which LGM most appropriately represented change over time in marital satisfaction.

Results indicated that, compared to the linear model ($\chi^2(2) = 5.158, p = .076$; CFI = .989, RMSEA = .106), the non-linear model ($\chi^2(1) = .001, p = .971$; CFI = 1.000, RMSEA = .000; see Figure 1) fit the data better ($p = .023$). The standardized slope loadings were as follows: Time 1, .00; Time 2, -.12; Time 3, .31. Time 3 error variance was fixed to zero because analyses indicated non-significance (Aunola & Nurmi, 2004). Thus, for all subsequent analyses the marital satisfaction variance at Time 3 was also constrained to zero.

The means and variances of the two latent variables, the intercept and the slope, were also inspected. The intercept mean indicated average marital satisfaction at Time 1 ($M = 110.45, p < .001$). A significant intercept variance indicated that couples differed in marital satisfaction at Time 1 ($\sigma^2 = 27.52, p < .001$). The slope mean indicated the average change in marital satisfaction over time ($M = -1.08, p = .126$). A significant slope variance indicated that couples differed in how marital satisfaction changed over time ($\sigma^2 = 10.71, p = .039$). Thus, preliminary analyses demonstrated sufficient interindividual differences in baseline levels and intraindividual change in marital satisfaction. Such evidence provided justification for incorporating emotion regulation as a predictor in subsequent analyses to explain this variation.

Primary Analyses:

The Association between Emotion Regulation and Marital Satisfaction

As *magnitude* and *duration* of emotion regulation represent relatively distinct measures of emotion regulation, all primary analyses were conducted separately for these two sets of measures. The analyses for *duration* will be reported first. This will be followed by the second set of analyses for *magnitude*. As described earlier, all analyses controlled for couples' number of negative emotion events and arousal during negative emotion events.

Primary Analyses – Duration of Emotion Regulation

Aim 1: Testing the Association Between Emotion Regulation (Duration) and Marital Satisfaction

Primary analyses tested whether emotion regulation at Time 1 predicted concurrent levels (i.e., intercept) as well as change (i.e., slope) in marital satisfaction across time. An LGM was specified, incorporating couples' composite emotion regulation as the predictor of the intercept and slope of couples' marital satisfaction (See Figure 2). Of primary interest were the regression paths between the predictor variable and the intercept and slope of marital satisfaction.

Hypothesis 1a: Couples' Emotion Regulation (Duration) Would Positively Predict Couples' Concurrent Marital Satisfaction

Results indicated that emotion regulation for duration positively predicted the intercept of marital satisfaction, $B = .585$, $SE(B) = .183$, $p = .001$. Thus, greater emotion regulation with respect to regulating the duration of time spent in a highly negative emotional state (i.e., minimizing duration) predicted greater concurrent marital satisfaction.

To determine which specific emotion regulation variable (i.e., regulation of experience, physiology, behavior) accounted for this effect, a follow-up analysis was conducted by specifying an LGM that incorporated these three variables as correlated predictors (see Figure 3). This follow-up analysis indicated that the effect was driven by couples' regulation of experience, which positively predicted concurrent marital satisfaction, $B = .27$, $SE(B) = .082$, $p = .001$. There were no significant effects for the regulation of physiology, $B = .126$, $SE(B) = .843$, $p = .881$, or for the regulation of behavior, $B = .138$, $SE(B) = .106$, $p = .193$.

In sum, these results support the hypothesis that couples' emotion regulation positively predicts couples' concurrent marital satisfaction. Shorter duration of time spent in a highly negative state predicted greater concurrent marital satisfaction. The effect was driven by the regulation of experience. Thus, shorter duration of time spent in a state experienced as highly negative (as assessed by the rating dial video recall procedure) predicted greater concurrent marital satisfaction (as assessed by questionnaires).

Hypothesis 1b: Couples' Emotion Regulation (Duration) Would Positively Predict Couples' Change in Marital Satisfaction over 13 Years.

Results indicated that couples' emotion regulation did not predict change in marital satisfaction over time, $B = .123$, $SE(B) = .091$, $p = .178$. Thus, Hypothesis 1b was not supported.

Aim 2a: Gender as a Moderator of the Association Between Emotion Regulation (Duration) and Marital Satisfaction

To examine the role of gender in the association between emotion regulation and marital satisfaction, a different analytic approach was employed. Given that the data in the present study came from married spouses, non-independence was an issue both for predictor (i.e., emotion regulation) and outcome (i.e., marital satisfaction) variables. To this point, non-independence was dealt with by utilizing couple-level scores in predictors and outcomes. However, in the present aim, gender effects on the association between emotion regulation and marital satisfaction were of interest. As such, individual spouse-level scores were introduced as predictors of couple-level marital satisfaction. Given interdependence between men (husbands) and women (wives) in this sample of married couples, an analysis of these gender effects required the introduction of an actor-partner modeling approach into the LGM framework (APIM LGM; Olsen & Kenny, 2006) to account for the non-independence of predictor variables.

Hypothesis 2a stated that wives' emotion regulation would be more strongly related to couples' marital satisfaction than husbands' emotion regulation. To test this hypothesis, an APIM LGM where regression paths were freely estimated for husbands and wives was compared with an APIM LGM in which regression paths were constrained to be equal for husbands and wives. A significant drop in model fit ($\Delta\chi^2$, $p < .05$) in the constrained model compared to the unconstrained model indicated that husbands' and wives' emotion regulation differently predicted couples' marital satisfaction. Subsequently, individual path coefficients were examined to pinpoint more precisely whether husbands' or wives' emotion regulation mattered more for couples' marital satisfaction.

Gender Differences in the Duration of Emotion Regulation and Marital Satisfaction. As noted above, a significant positive relationship was found between the composite score for duration of emotion regulation and concurrent marital satisfaction. The APIM LGM indicated that this association was different for wives and husbands ($\chi^2(2) = 6.441, p = .04$). Specifically, wives' greater emotion regulation predicted greater concurrent couples' marital satisfaction, $B = .386, SE(B) = .126, p = .002$. In contrast, husbands' emotion regulation did not predict concurrent couples' marital satisfaction, $B = .07, SE(B) = .156, p = .622$. There were no significant slope effects ($ps > .05$).

To determine which specific emotion regulation variable (i.e., regulation of experience, physiology, behavior) accounted for this effect, a follow-up analysis was conducted by specifying an APIM LGM that incorporated these variables for husbands and wives as correlated predictors. Of primary interest were the regression paths between the predictor variables and the intercept and slope of marital satisfaction. This follow-up analysis indicated that wives' regulation of experience, $B = .170, SE(B) = .047, p < .001$, and wives' regulation of behavior, $B = .161, SE(B) = .071, p = .024$, positively predicted concurrent couples' marital satisfaction. There was no significant effect for wives' regulation of physiology, $B = -.038, SE(B) = .484, p = .937$, or for husbands' regulation of experience, $B = .049, SE(B) = .065, p = .446$, behavior, $B = -.038, SE(B) = .074, p = .607$, or physiology, $B = .672, SE(B) = .518, p = .194$ on concurrent couples' marital satisfaction. There were no significant slope effects ($ps > .05$).

These results support the hypothesis that wives' emotion regulation would be more strongly related to couple's marital satisfaction than husbands' emotion regulation. Specifically, wives' ability to regulate (i.e., minimize) the duration of her own negative emotional experience and negative emotional behavior predicted greater concurrent couples' marital satisfaction. In contrast, husbands' emotion regulation did not predict couples' marital satisfaction.

Aim 2b: Age as a Moderator of the Association Between Emotion Regulation (Duration) and Marital Satisfaction

Hypothesis 2b stated that couples' emotion regulation would be more strongly related to marital satisfaction for older couples compared to middle-aged couples. To test this hypothesis, an LGM multi-group modeling approach (e.g., Duncan & Duncan, 2004) was utilized. First, a two-group model was specified in which regression paths between predictor variables and the intercept and slope of marital satisfaction were estimated freely (unconstrained) for middle-aged and older couples. Then, a two-group model was specified in which regression paths were constrained to be equal across middle-aged and older couples. A significant drop in model fit ($\Delta\chi^2, p < .05$) in the constrained model compared to the unconstrained model indicated that associations between emotion regulation and marital satisfaction differed for middle-aged versus older couples. Subsequently, individual path coefficients were examined to pinpoint more precisely which paths exactly differed for middle-aged and older couples.

Age Differences in the Duration of Emotion Regulation and Marital Satisfaction. As noted above, a significant positive relationship was found between the composite score for duration of emotion regulation and concurrent marital satisfaction. Multi-group modeling indicated that this association was similar for middle-aged and older adults ($\chi^2(2) = 2.84, p = .241$). To examine potential age differences in the relationship between specific emotion regulation variables (i.e., regulation of experience, physiology, behavior) and marital satisfaction, a two-group LGM was specified incorporating these three variables as correlated

predictors. Multi-group modeling indicated that associations between these three variables and marital satisfaction were similar for middle-aged and older adults ($\chi^2(3) = 4.875, p = .181$). There were no significant slope effects ($ps > .05$).

These results indicate that hypothesis 2b was not supported. There was no significant difference between middle-aged and older couples in the association between the duration of emotion regulation and marital satisfaction.

Primary Analyses – Magnitude of Emotion Regulation

Consistent with analyses conducted on the *duration* of regulation variables, a set of parallel analyses was run for the *magnitude* of regulation variables. Results indicated that couples' magnitude of emotion regulation did not predict marital satisfaction at Time 1, $B = 1.066, SE(B) = 2.426, p = .660$, or predict change in marital satisfaction over time, $B = .147, SE(B) = .869, p = .866$. Furthermore, there was no evidence of moderation by gender, $\chi^2(3) = .152, p = .985$, or age, $\chi^2(3) = 2.847, p = .416$, in the association between emotion regulation and marital satisfaction.

Primary Analyses – Summary

In sum, results supported the hypothesis that couples' emotion regulation would positively predict couples' concurrent marital satisfaction. Specifically, shorter duration of time spent in a highly negative state predicted greater concurrent marital satisfaction. The effect was driven by the regulation of experience. Thus, shorter duration of time spent in a state experienced as highly negative predicted greater concurrent marital satisfaction.

Furthermore, these results supported the hypothesis that wives' emotion regulation would be more strongly related to couple's marital satisfaction than husbands' emotion regulation. Specifically, wives' ability to regulate (i.e., minimize) the duration of her own negative emotional experience and negative emotional behavior predicted greater concurrent couples' marital satisfaction. In contrast, husbands' emotion regulation (i.e., duration) did not predict couples' marital satisfaction. (See Figure 4).

Contrary to what was hypothesized, there was no significant difference between middle-aged and older couples in the association between emotion regulation (i.e., duration) and marital satisfaction. Additionally, couples' emotion regulation did not predict change in marital satisfaction over time.

Finally, there was no evidence of any relationship between the *magnitude* of emotion regulation and marital satisfaction. Together, these results indicate that what is critical is not *how much* couples are able to downregulate following distress (i.e., magnitude of regulation), but rather *the duration of time* couples spend in a highly negative state following distress.⁶

Aim 3: Comparing Direct Measures of Emotion Regulation with a Questionnaire Measure of Emotion Regulation

⁶ Notably, all results remained stable when analyses controlled for the alternative measure of emotion regulation (i.e., controlling for magnitude of emotion regulation in analyses focused on the link between duration of emotion regulation and marital satisfaction, and vice versa). This is important given the evidence of a moderate correlation between the two variables. (Table A).

The study's direct measures of emotion regulation were compared with the questionnaire measure of emotion regulation.

Descriptive Statistics.

Descriptive statistics were calculated to compare the study's direct measures of couples' emotion regulation (i.e., magnitude and duration) with the questionnaire measure of couples' emotion regulation.

Table F shows correlations among direct measures of couples' emotion regulation (i.e., magnitude and duration), the questionnaire measure of couples' emotion regulation, and couples' marital satisfaction. Results indicated no significant associations between direct and questionnaire measures of emotion regulation. However, results indicated a positive correlation between the questionnaire measure of emotion regulation and marital satisfaction at all three time points (Time 1, $r = .49, p < .001$; Time 2, $r = .51, p < .001$; Time 3, $r = .60, p < .001$), suggesting that greater questionnaire-based emotion regulation is linked to greater marital satisfaction.

Gender and age differences in the questionnaire measure of emotion regulation were also explored. No gender or age differences emerged.

In sum, results indicated no significant relationship between the present study's direct measures of couples' emotion regulation (i.e., magnitude and duration) and the questionnaire measure of couples' emotion regulation. This highlights the importance of measuring "online" emotion regulation, as distinct from questionnaire-measured regulation. Results also indicated that the questionnaire measure of emotion regulation was moderately correlated with marital satisfaction.

Comparison of direct versus questionnaire measures of emotion regulation in relation to marital satisfaction.

As noted above, a significant positive relationship was found between the present study's direct measure of emotion regulation (i.e., the composite score for duration of emotion regulation) and concurrent marital satisfaction. Given that the questionnaire measure of emotion regulation was also moderately correlated with marital satisfaction, follow-up analyses were conducted to determine whether the direct measure of emotion regulation (i.e., duration) continued to uniquely predict couples' marital satisfaction at Time 1 *when modeled together* with the questionnaire measure of emotion regulation. An LGM was specified, incorporating couples' composite emotion regulation (duration) and couples' questionnaire measure of emotion regulation as correlated predictors of the intercept and slope of couples' marital satisfaction. Of primary interest were the regression paths between the predictor variables and the intercept and slope of marital satisfaction.

Results indicated that both the direct measure of emotion regulation (duration), $B = .509$, $SE(B) = 0.181, p = .005$, and the questionnaire measure of emotion regulation, $B = .424$, $SE(B) = 0.069, p < .001$, positively predicted marital satisfaction at Time 1. The explained variance in marital satisfaction when the two measures were modeled together was substantially higher ($R^2 = .352$) than the variance explained by the direct measure of emotion regulation ($R^2 = .098$) or the questionnaire measure of emotion regulation ($R^2 = .288$) alone. It is likely that the explained variance was relatively larger for the questionnaire, versus direct, measure of emotion regulation because it shared method variance with the questionnaire measure of marital satisfaction (Bank, Dishion, Skinner, & Patterson, 1990). In contrast, the direct measure of emotion regulation (i.e., derived from continuous measurement of physiology, rating dial, and expressive behavior)

shared no common method variance with the questionnaire measure of marital satisfaction. There were no significant slope effects.

In sum, results indicated that both the direct measure of emotion regulation (duration) and the questionnaire measure of emotion regulation contributed uniquely to the prediction of couples' concurrent marital satisfaction. These results provided further support for the present study's direct measures of emotion regulation as distinct from a questionnaire measure of emotion regulation.

DISCUSSION

The present study assessed emotion regulation during conflict interactions in a longitudinal sample of middle-aged and older long-term married couples. The overarching goal of the study was to examine the link between couples' emotion regulation and marital satisfaction, both concurrent and longitudinally over a 13-year period. To achieve this aim, two direct measures of emotion regulation were developed (one based on duration of emotional response and the other based on magnitude of emotional response). I additionally examined whether the link between emotion regulation and marital satisfaction was moderated by gender and age. Finally, I evaluated the association between direct and questionnaire measures of emotion regulation, as well as their relationship with marital satisfaction.

Summary of Findings

First, the present study assessed the link between two direct measures of emotion regulation (i.e., *magnitude* of emotion regulation and *duration* of emotion regulation) and marital satisfaction. Results indicated that it was not critical for marital satisfaction how *much* couples were able to downregulate their negative emotional response following distress (i.e., magnitude). However, it was critical how *long* couples remained in a highly negative state (i.e., duration). Specifically, couples' shorter duration of time spent in a highly negative state following distressing events predicted greater concurrent marital satisfaction. The effect was driven by the regulation of emotional experience. Thus, shorter duration of time spent in a state experienced as highly negative predicted greater concurrent marital satisfaction.

Second, moderation analyses indicated that wives' emotion regulation was more strongly related to couples' marital satisfaction than husbands' emotion regulation. Specifically, wives' ability to regulate the duration of her own negative emotional experience and negative emotional behavior predicted greater concurrent couples' marital satisfaction. In contrast, husbands' emotion regulation did not predict couples' marital satisfaction. Contrary to what was hypothesized, there was no evidence for moderation by age. Thus, the association between emotion regulation and marital satisfaction was similar for middle-aged and older couples. There was also no evidence that emotion regulation predicted change in marital satisfaction over time.

An examination of gender and age differences in emotion regulation revealed that husbands and wives were similar in their ability to regulate emotion, and that older adults were worse than middle-aged adults at regulating the duration of their subjective emotional experience. Finally, a comparison of direct and questionnaire measures of emotion regulation revealed no correlation between the two sets of measures. However, direct and questionnaire measures each contributed uniquely to the prediction of couples' concurrent marital satisfaction.

Why did couples' emotion regulation, in duration, matter for couples' marital satisfaction?

Findings supported the hypothesis that couples' emotion regulation would positively predict couples' marital satisfaction. Specifically, couples' shorter duration of time spent in a highly negative state predicted greater concurrent marital satisfaction. Conversely, couples' longer duration of time spent in a highly negative state predicted poorer marital satisfaction. What was toxic about a longer duration of negativity during conflict?

From an evolutionary perspective, emotions are brief responses (Ekman, 1984; 1992) that facilitate problem solving (Levenson, 1994; Levenson, in press; Tooby & Cosmides, 1990). During interpersonal conflict, brief episodes of negative emotion may highlight problem areas in a relationship, which serves to motivate corrective behavior and promote resolution (Averill, 1983; Carver & Harmon-Jones, 2009; Frijda, 1986). Thus, *brief* negative emotions during marital conflict may function to facilitate effective problem solving, which in turn fosters marital satisfaction (Billings, 1979; Pasch & Bradbury, 1998; Rusbult, Johnson, & Morrow, 1986).

The present findings suggest that negative emotion becomes troublesome when it is *sustained*. It has been demonstrated repeatedly that sustained negative emotion during interpersonal conflict is associated with poor problem solving (Donohue, 1991; Forgatch, 1989; Prager, 1991; Rueter & Conger, 1995). For example, Donohue (1991) showed that sustained negative affect was linked to unsuccessful problem solving during divorce mediation. One hypothesized mechanism is that sustained negativity is linked to impairment in various aspects of cognitive functioning, such as attention and other-focus, which adversely affects problem solving (Davis, 1982; Easterbrook, 1959; Zelazo, Carter, Reznick, & Frye, 1997). Given that poor problem solving may hinder marital quality (Feldman, 1982; Margolin & Wampold, 1981), this may account for the present finding that sustained negative emotion during marital conflict was linked to poorer marital satisfaction.

Sustained negative emotion has also been linked to negative physiological effects during marital conflict, including increased blood pressure and decrement in immune functioning (Ewart, Taylor, Kraemer, & Agras, 1991; Kiecolt-Glaser et al., 1993; Malarkey, Kiecolt-Glaser, Pearl, & Glaser, 1994; Morell & Apple, 1990), as well as poor physical health outcomes such as cardiovascular disease (Miller, Smith, Turner, Guijarro, & Hallet, 1996) and cancer risk (Penninx et al., 1998). Poor health, in turn, can be a burden for marital satisfaction (c.f., Kiecolt-Glaser & Newton, 2001). Thus, physical health is another mediational pathway that may account for the link between sustained negative emotion during marital conflict and poor marital satisfaction.

To this point, I have speculated about mediational pathways through which greater emotion regulation may foster greater marital satisfaction. Still, the alternative speculation remains that couples that are more satisfied in their marriages may be more adept at minimizing the duration of negative emotional arousal during conflict. Future research, which measures emotion regulation at multiple points across the lifespan, may elucidate the direction of causality.

Why did couples' emotion regulation in magnitude not matter for couples' marital satisfaction?

The second measure of emotion regulation derived for the present study was the magnitude of emotion regulation. Results indicated that the magnitude with which a couple declined in emotional arousal following distressing events was *not* linked to marital satisfaction. On the one hand, a decline in intensity of activated negative emotion may be a key component of effective emotion regulation (c.f., Thompson, 1994), in that it supports an environment in which interpersonal conflict resolution is more likely (c.f., Prager, 1991). On the other hand, this

downregulation may reflect a quality of interactional emotional volatility (i.e., rapidly shifting from high to low arousal states) that has been linked to poor marital outcomes. For example, Gottman and Levenson (2002) found that emotional volatility is characteristic of a pattern of couples' affect regulation that is predictive of marital dissolution. From an intervention standpoint, emotional volatility also characterizes the "most difficult-to-treat" form of marital conflict (Weingarten et al., 1987). Therefore, it is unclear whether couples' magnitude of emotion regulation reflects positively or negatively on couples' conflict management. As a result, this measure of emotion regulation might not have shown a relation to marital satisfaction.

There is also an alternative interpretation of this null finding with respect to magnitude of emotion regulation. It is possible that couples could evidence a significant reduction in negative emotional arousal (i.e., a large magnitude of emotion regulation), but still be above a negativity threshold below which it would be crucial to decline in order to achieve sufficient emotion regulation. Support for this interpretation is the finding that the duration of emotion regulation, defined as the time required to decrease sufficiently⁷ in arousal following a highly negative emotion event, *was* related to marital satisfaction. Notably, our laboratory has found duration to be a useful measure of regulation-related effects in two other studies (on the link between physiological down-regulation and positive emotion: Fredrickson & Levenson, 1998; Yuan, McCarthy, Holley, & Levenson, 2010).

Why did couples' duration of emotion regulation in experience, and not behavior or physiology, matter for couples' marital satisfaction?

The present study evaluated which specific component (i.e., regulation of experience, physiology, or behavior) drove the effect of couples' emotion regulation (i.e., duration) on couples' concurrent marital satisfaction. Results indicated that the effect was driven specifically by the duration of regulation of subjective emotional experience. In other words, shorter duration of time spent in a state experienced as highly negative predicted greater concurrent marital satisfaction.

What might prioritize the regulation of subjective emotional experience, and not emotional behavior or physiology, in predicting marital satisfaction? It has been argued that emotional experience is the most holistic indicator of our emotional responding (Levenson, in press). In other words, emotional experience is constructed from various external and internal sources of information, including the other components of our emotional response system: visceral and somatic perceptions (i.e., physiology: Levenson, 1999) and facial feedback (i.e., behavior: Ekman, Levenson, & Friesen, 1983; Levenson, Ekman, & Friesen, 1990).

This holistic view of subjective emotional experience is echoed by various theoretical and empirical sources. For example, Lakoff's (1987) linguistic theories of metaphor demonstrate that our use of metaphors to communicate subjective emotional experience is based on physiological or bodily changes (e.g., "burning up with rage"). Consistent with the idea that subjective emotional experience is informed by physiology, a recent study demonstrated that individuals who had received body awareness training, and were thus more attuned to physiological changes, evidenced a greater linkage between their physiological arousal and subjective emotional experience (Sze, Gyurak, Yuan, & Levenson, 2010). To the extent that emotional experience is

⁷ A "sufficient" decrease in arousal was indicated when couples no longer qualified for high negative arousal. The specific criteria for high negative arousal were as follows: 1) physiological measures: z-scores were greater than or equal to 1.0 for at least 3 measures; 2) self-reported affect: z-scores were greater than or equal to 1.0 (reverse-scored); 3) emotion behavior: negative emotion behavior was present. For more detail, please see Method section.

indeed the “common pathway,” we can understand why results indicated a strong association between the regulation of experience and marital satisfaction, but not an additional association between the regulation of behavior or physiology and marital satisfaction.

In addition, marital satisfaction is a subjective perception that requires a conscious evaluation of the quality of a marriage. When evaluating their marriage, couples may draw from multiple sources of information; these sources must also be consciously evaluated. Thus, couples’ emotion regulation (i.e., decline in emotional arousal in domains of experience, behavior, and physiology) may need to be subjectively perceived in order to impact marital satisfaction. Emotional experience is, by definition, subjectively perceived. In contrast, individuals are rather poor at perceiving changes in their physiology (Pennebaker, 1981; 1982) and facial expressive behavior (Ambady & Weisbuch, 2010; Barr & Kleck, 1995; Gilovich, Savitsky, & Medvec, 1998).

Under what conditions might we have observed an association between the regulation of physiology or behavior and marital satisfaction? I suggest that individuals with heightened physiological or behavioral self-awareness would base their reported marital satisfaction more closely on regulation in these response domains. There is evidence of individual differences in self-awareness of physiological and behavioral changes: for example, compared to control participants, experienced meditators report greater visceral awareness (Sze et al., 2010) and theater actors are better at self-monitoring their facial expressions (Snyder, 1974). Thus, a linkage between the regulation of physiology or behavior and marital satisfaction may have been observed had the sample been evaluated for, and parsed by, self-awareness in these domains.

As stated, the present study found no overall associations between physiological or behavioral regulation and marital satisfaction. Interestingly, however, findings indicated that regulation of the duration of negative emotional behavior *did* predict greater concurrent couples’ marital satisfaction – for wives’ regulation, but not for husbands’. A feasible explanation for this finding is the self-awareness hypothesis. Evidence abound that women, compared to men, demonstrate greater posed expression accuracy, i.e., the ability to deliberately convey affective messages through facial cues (c.f., Hall, Carter, & Horgan, 2000). This necessarily involves self-awareness of facial behavior. It is possible that a gender difference in behavioral self-awareness underlies the link between wives’, and not husbands’, behavioral regulation and marital satisfaction.

Why were husbands and wives similar in their ability to regulate emotion?

Despite widespread belief in gender differences across emotional response domains (Shields, 2003), few studies have directly assessed gender differences in emotion regulation (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008). Findings from the present study indicated no gender differences in the ability to regulate one’s own negative emotional arousal during conflict. This is consistent with the lack of gender differences in emotion regulation observed in: a) self-reported use of emotion regulation strategies in daily life (Gross & John, 2003; Gross, Richards, & John, 2006) and b) direct measures of the ability to use a particular emotion regulation strategy when confronted with instructions to regulate (McRae et al., 2008). However, emerging evidence based on neural imaging indicates that, while there may be no gender differences in the ability to regulate emotion, there are gender differences in the efficiency and effort required for regulation (McRae et al., 2008). Therefore, gender differences in emotion regulation may have been observed had the present study incorporated measures of efficiency or effort in the assessment of emotion regulation.

Why did wives', and not husbands', emotion regulation matter for couples' marital satisfaction?

Findings from the present study supported the hypothesis that wives' emotion regulation ability would be more strongly related to couples' marital satisfaction than husbands' emotion regulation ability. This hypothesis was derived from the existing literature, which indicates that women are more responsible for regulating marital distress (e.g., Ginsburg & Gottman, 1986). For example, wives, but not husbands, are perceived to be more efficacious and important (i.e., raising issues of disagreement and planning problem solving) when negotiating marital conflict (Ball, Cowan, & Cowan, 1995). Similarly, Gottman and Levenson (1992) concluded that, "wives are much more likely than husbands to take responsibility for regulating the affective balance in marriage..." (p. 232). Importantly, the present study found no gender differences in the actual *ability* to regulate emotion. Thus, I speculate that the common stereotype that women are better than men at emotion regulation may lead couples to be attuned to wives', and not husbands', emotion regulation during conflict. This may color couples' perception of marital quality, as reflected in the finding that wives' emotion regulation was more strongly related to couples' marital satisfaction.

Why were older adults worse than middle-aged adults at regulating their emotional experience?

Findings from the present study indicated that older adults were worse than middle-aged adults at regulating the duration of their subjective emotional experience. This finding is in contrast to a large body of self-report (e.g., Blanchard-Fields, 2007; Gross et al., 1997) and laboratory-based (e.g., Mather & Carstensen, 2003; Kunzmann, Kupperbusch, & Levenson, 2005) studies indicating that emotion regulation is preserved or enhanced with age.

More recently, a systematic investigation of age differences in different forms of emotion regulation demonstrated that the ability to engage in positive reappraisal and suppression was improved and maintained with age, respectively (Shiota & Levenson, 2009). In contrast, success at engaging in detached reappraisal *declined* with age in a roughly linear manner. Interestingly, the detachment observed in detached reappraisal may reflect the withdraw response, which is a common approach to regulation during interpersonal conflict (Eldridge & Christensen, 2002; Heavey, Layne, & Christensen, 1993). While I did not assess the specific emotion regulation strategies utilized in the present study, I speculate that withdrawing was a key feature. Thus, the finding that older individuals were less effective at regulating their negative emotional experience may reflect the fact that older individuals were less successful at withdrawing, or detaching, during conflict.

Why did age not moderate the association between emotion regulation and marital satisfaction?

Results did not support the hypothesis that couples' emotion regulation would be more important for couples' marital satisfaction with greater age. In the present study, emotion regulation was assessed at a single time point. As such, age differences in the association between emotion regulation and marital satisfaction were necessarily evaluated cross-sectionally (i.e., evaluated in a middle-aged versus older cohort of subjects; conclusions with respect to age differences were then drawn from observed discrepancies between cohorts). However, a limitation of this cross-sectional design was that age and cohort effects were non-distinguishable; additionally, age was confounded with marital duration (i.e., older couples were married for a longer duration compared to middle-aged couples). Accordingly, in the present study it is not possible to attribute the presence or absence of differences between middle-aged and older

couples to their chronological age. To provide a clearer test of age differences, future studies should utilize a longitudinal design to examine patterns of change in the association between emotion regulation and marital satisfaction within couples over time. Longitudinal approaches may be more fruitful in revealing age differences in this domain.

Why was there no indication that emotion regulation predicts change in marital satisfaction over time?

Contrary to what was hypothesized, findings indicated that emotion regulation did not predict changes over time in marital satisfaction. This may well be because marital satisfaction among long-term married couples is highly stable over time (Johnson, Amaloz, & Booth, 1992). In the present study, correlations of marital satisfaction measured at three waves over a 13-year period ranged from .86 to .87, which reflects a very high degree of stability (see Table A). Given this stability, it may require more dramatic life events than greater or lesser emotion regulation to alter the established trajectory of marital satisfaction (c.f., Haase et al., under review). In contrast, more newlywed couples may not yet be locked into a stable trajectory of marital satisfaction (National Center for Health Statistics, 1999). Therefore, emotion regulation during couple conflict may predict changes in the trajectory of marital satisfaction among newer marriages (or among long-term marriages following dramatic life events). Future studies should investigate this possibility.

Nonetheless, these findings *did* demonstrate a sustained association between emotion regulation at Wave 1 and marital satisfaction at all three study waves. This indicates that emotion regulation continues to be an important correlate of satisfied marriages over time.

Comparing direct (duration) and questionnaire measures of emotion regulation: Unique measures, unique consequences.

Results showed that direct and questionnaire measures of emotion regulation were not associated with each other. This may seem surprising given that both direct and questionnaire measures seek to assess the same underlying construct. However, the finding is consistent with the frequent observation in affective science that emotional phenomena measured with different methods are weakly or non-significantly correlated (Bradley & Lang, 2000; Cacioppo, Berntson, & Klein, 1992). Questionnaire measures of emotion regulation may reflect beliefs about emotion regulation or perceptions about general tendencies with respect to emotion regulation (Barrett, 1997; Robinson & Clore, 2002), which may not necessarily be accurate (or may not be accurate in particular contexts). In contrast, direct measures of emotion regulation assess actual emotional responding in a particular context. An important caveat is that the questionnaire measure used to assess emotion regulation in the present study was not a standard emotion regulation questionnaire, but was derived for the purpose of this study using items from other scales. However, these items were very similar to items typically used in emotion regulation questionnaires (e.g., “In general, how do you feel about the ways you and your partner share your feelings?;” see Table G).

The lack of correlation between these two sets of measures has important implications underscoring the importance of using ecologically-valid, direct measures of emotion regulation, which have received far less attention than self-report measures. Moreover, this suggests that findings obtained for questionnaire measures of emotion regulation (e.g., regarding age differences in emotion regulation) may not necessarily hold for direct measures of emotion regulation.

Nonetheless, despite their non-significant correlation, both direct and questionnaire measures of emotion regulation contributed uniquely to predicting concurrent couples' marital satisfaction. This finding again underscores the value of measuring both "online" ecologically-valid emotion regulation and questionnaire-based emotion regulation in relation to marital outcomes. One additional and important advantage of direct measures of emotion regulation over questionnaire measures is that direct measures do not share common method variance when predicting questionnaire-based well-being outcomes such as marital satisfaction.

Qualitative Component: An Exploratory Analysis

An exploratory qualitative component was included in the present study to elaborate on the characteristics of the marital interactions in couples demonstrating greater and lesser emotion regulation. Couples with greater and lesser emotion regulation were identified based on the results of the present study, which indicated that couples' regulation of the duration of their emotional experience predicted couples' concurrent marital satisfaction. Thus, I evaluated the videotaped interactions of the five couples that demonstrated a) the greatest and b) the least emotion regulation with respect to minimizing the duration of their negative subjective emotional experience during conflict. The qualitative evaluation drew on speech content, voice tone, paralinguistic behavior, and other broad clinical observations (see Method section for rationale).

Couples demonstrating greater emotion regulation.

A qualitative examination of the marital interactions of couples with greater emotion regulation revealed similarities across domains of paralinguistic behavior, speech content, and affective tone. Common paralinguistic behaviors included congruent emotional responding between spouses (e.g., mutual laughs and smiles) and active facial behavior (e.g., eyebrow raises). Common speech content included verbal indicators of close listening (e.g., "uh-huh," "mmhmm," "okay," "yea," "I see"), acknowledgement of a mutual contribution to the problem, offering possible solutions to the identified problem, and reflecting back (i.e., summarizing or acknowledging) what the other partner had previously communicated. The affective tone of conflict among these couples was neutral to pleasant in nature and reflected a sense of patience, acceptance, and positive regard.

Please see Appendix C for a transcript of the first five minutes of the conflict interaction of a couple demonstrating greater emotion regulation, which illustrates well many of these qualities.

Couples demonstrating lesser emotion regulation.

A qualitative examination of the marital interactions of couples with lesser emotion regulation revealed similarities across domains of paralinguistic behavior, speech content, and affective tone. Common paralinguistic behaviors included facial behavior that communicated disdain (e.g., eye rolls) or disinterest (e.g., looking away) and incongruent emotional responding between spouses (e.g., in a given moment, one spouse evidenced laughter and the other evidenced anger). Common speech content included accusatory and absolute statements (e.g., "you always..."), the isolation of the problem in a single spouse (e.g., "why do you have a problem with..."), frequent interrupting and speaking over one another, and a dearth of perspective-taking. The affective tone of conflict among these couples was flat to hostile in nature and reflected a sense of sustained frustration, rejection, and dislike.

Please see Appendix C for a transcript of the first five minutes of the conflict interaction of a couple demonstrating lesser emotion regulation, which illustrates well many of these qualities.

Summary.

Differences were apparent in the interaction qualities of couples demonstrating greater compared to lesser emotion regulation. Couples demonstrating greater emotion regulation appeared to foster calm, engagement, mutual respect, and collaboration, both with respect to the conceptualization of the problem (i.e., a sense that the problem was not located in just one partner) and the approach to problem-solving. This characterization of conflict is consistent with the “optimal dyadic regulation of emotion” described in the clinical literature: “the partners remain engaged and oriented toward one another even when things get difficult” (Fosha, 2001, p. 228). Ultimately, this calm and collaborative milieu was in service of problem-solving, as evidenced by the fact that the majority of the couples demonstrating greater emotion regulation arrived at a mutually-agreeable solution within the first five minutes of conflict (c.f., Appendix C); all of these couples arrived at one or more solutions within the allotted 15 minutes. This appears consistent with the idea that emotion, when regulated, serves the evolutionary function of problem-solving (Levenson, in press; Tooby & Cosmides, 1990).

In contrast, couples demonstrating lesser emotion regulation appeared to foster self-focus, rejection, and hostility. In these marital conflicts, sustained negativity was frequently observed; solution-oriented conversation was not. The hostile and self-focused milieu of conflict among couples demonstrating lesser emotion regulation did not appear to lend itself to problem-solving. In fact, in the latter half of the transcript in Appendix C, both partners evidenced such emotional over-involvement in their own side of the argument that each partner spoke over and appeared to completely tune out the other, carrying on with independent arguments and lines of reasoning. In absence of listening and providing relevant responses to one another, which is arguably the minimal requirement for effective communication (Davis, 1982), problem-solving was improbable.

Findings from the present study also indicated that wives’, and not husbands’, ability to regulate emotion was related to couples’ marital satisfaction. However, the present qualitative examination did not reveal any conspicuous gender differences between couples demonstrating greater or lesser emotion regulation.

Strengths and Limitations

The present study had several strengths and limitations. First, participants were long-term married couples. This provided a unique view into the emotional regulation of couples that had survived the first seven years of marriage in which more than half of all divorces occur (Cherlin, 1982). This strength, however, also posed limitations given that long-term marriages are likely to be different from newlywed marriages in various ways. In addition to the shorter duration of the union, newlywed marriages are characterized by different priorities and challenges compared to long-term marriages. For example, early years of marriage are a time in which many couples are raising one or more young children; in contrast, long-term married couples with older children are more likely to be dealing with dissimilar relational stressors (c.f., Bradbury & Karney, 2004). It may be that emotion regulation is differentially associated with marital outcomes in different marital contexts. Thus, future studies of emotion regulation and marriage should include a wider range of couples with respect to age and length of marriage.

Findings from the present study may also be limited in generalizability given that the sample was representative of individuals of their age group in the San Francisco Bay Area. The representative sample was largely comprised of Caucasian individuals who were of relatively high educational attainment and socioeconomic status (Levenson, Carstensen, & Gottman, 1993). Therefore, the present findings may not generalize to other ethnic, educational, or socioeconomic groups. Future research should include a wider range of demographics among participants. For example, it would be interesting to replicate this study using a sample diverse in socioeconomic status (e.g., low), race and ethnicity (e.g., African-American), and country of origin (e.g., Germany).

An additional limitation is in relation to the questionnaire measure of emotion regulation utilized in the present study. The questionnaire measure was derived from existing questionnaire data on managing emotions in the marital relationship. Despite a high degree of internal reliability and face validity among the aggregated data, these questionnaires were not originally designed to specifically assess emotion regulation. Therefore, it remains uncertain whether the study's questionnaire measure assessed emotion regulation in ways similar to contemporary measures. Future studies should compare the present study's direct measures of emotion regulation with well-validated and frequently used questionnaire measures of emotion regulation, such as the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) or the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004).

Finally, the present study did not find an association between the regulation of physiology and marital outcomes. However, following distressing events during conflict, it was more frequent to observe the continued duration of high negative arousal in the domains of experience and behavior (both $n = 118$) compared to physiology ($n = 51$). The variable reflecting the emotion regulation of physiology had the fewest observations and, therefore, the possibility remains that there was an insufficient sample size to attain significant results. This is an important methodological limitation that may be accounted for in future studies by increasing the total number of participants.

Directions for Future Research and Clinical Applications

A variety of research directions are possible that build on the present study. Direct measurement of emotion regulation among individuals has been recently linked to a variety of outcomes, including psychological health (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Liverant, Brown, Barlow, & Roemer, 2008), physical health (Coifman, Bonanno, Ray, & Gross, 2007), and socioeconomic status (Cote, Gyurak, & Levenson, 2010). Future research should investigate the link between the present study's naturalistic measure of emotion regulation and a wider range of outcome measures, such as psychological and physical health, income, and educational attainment.

Laboratory-based research on emotion regulation has been conducted with various dyads, including parent-child (Cole, Martin, & Dennis, 2004; Eisenberg, Cumberland, & Spinrad, 1998) and strangers (Butler et al., 2003; Richards, Butler, & Gross, 2003). Future research could utilize the present study's methodological approach to study emotion regulation with dyads other than married couples.

Future studies should aim to identify the antecedents of emotion regulation as assessed in the present study. It may be that factors such as certain genetic polymorphisms, attachment styles, personalities, or patterns of interaction may predict whether participants achieve greater or lesser emotion regulation. For example, in the present study one potential antecedent of

ineffective emotion regulation (i.e., sustained negativity) is negative affect reciprocity, which refers to the toxic pattern of spousal interactive behavior wherein a spouse's emotions are more likely to be negative after his or her partner has exhibited negativity (Gottman, 1999). Notably, this pattern is defined by reciprocity, or mutual influence, consistent with the idea that emotion regulation in couples is characterized by high levels of interdependence (Diamond & Aspinwall, 2003). In the case of negative affect reciprocity, that interdependence may be functioning maladaptively in that it serves to sustain negativity.

Findings in the present study indicated that older adults were worse than middle-aged adults at regulating the duration of their negative subjective emotional experience. In contrast, a large body of empirical literature suggests that emotion regulation is intact or even improved with age. In view of conflicting findings, future research should aim to further clarify age differences in specific facets of emotion regulation.

The present study demonstrated that couples' greater ability to regulate their emotional experience predicted greater marital satisfaction. This provides substantial information to guide the development and implementation of clinical interventions and, particularly, emotionally-focused couple therapies. For example, Emotion-Focused Therapy for Couples (EFT-C) is an empirically supported treatment that views emotion regulation as a central agent of change in relationship improvement (Johnson, 2004; 2007). Existing emotionally-focused couple therapies, such as EFT-C, may be able to utilize insights derived in the present study to tailor, prioritize, or expand interventions targeting emotion regulation. For example, the finding that couples' duration of emotion regulation is critical for marital satisfaction suggests interventions that focus on the timing of recovery from negativity during conflict. Similarly, the finding that the link between emotion regulation and marital satisfaction may be stronger for women than for men may enhance the ability to provide tailored interventions for couples in the marital therapy context.

Conclusion

Few studies have investigated the association between how well spouses regulate emotion and how satisfied they are with their marriages. The present study tested whether effective emotion regulation in the context of naturalistic marital interaction is associated with greater marital satisfaction. Findings indicated that couples' greater ability to regulate the duration of their negative emotional experience predicted couples' greater concurrent marital satisfaction. Moreover, results indicated that wives' emotion regulation was more strongly related to couples' marital satisfaction than was husbands' emotion regulation. These findings point to future directions for the study of emotion regulation in the marital context and other interpersonal dyads, as well as implications for interventions in marital counseling.

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Table A: *Intercorrelations for Couples' Emotion Regulation Variables and Couples' Marital Satisfaction*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Predictors											
1. Magnitude, Composite	-										
2. Magnitude, Experience	.56***	-									
3. Magnitude, Behavior	.57***	.02	-								
4. Magnitude, Physiology	.48***	-.12	-.11	-							
5. Duration, Composite	.43***	.27**	.36***	-.06	-						
6. Duration, Experience	.15	.19*	.14	-.08	.51***	-					
7. Duration, Behavior	.34***	.08	.48***	.01	.58***	.28**	-				
8. Duration, Physiology	.09	.09	-.05	.13	-.12	-.19	.08	-			
9. Marital Satisfaction, Wave 1	-.002	-.08	.07	.01	.26**	.34***	.24**	-.05	-		
10. Marital Satisfaction, Wave 2	-.03	.004	-.05	-.004	.35***	.36***	.32**	.01	.86***	-	
11. Marital Satisfaction, Wave 3	-.05	-.04	-.06	.01	.16	.15	.22	-.07	.87***	.86***	-

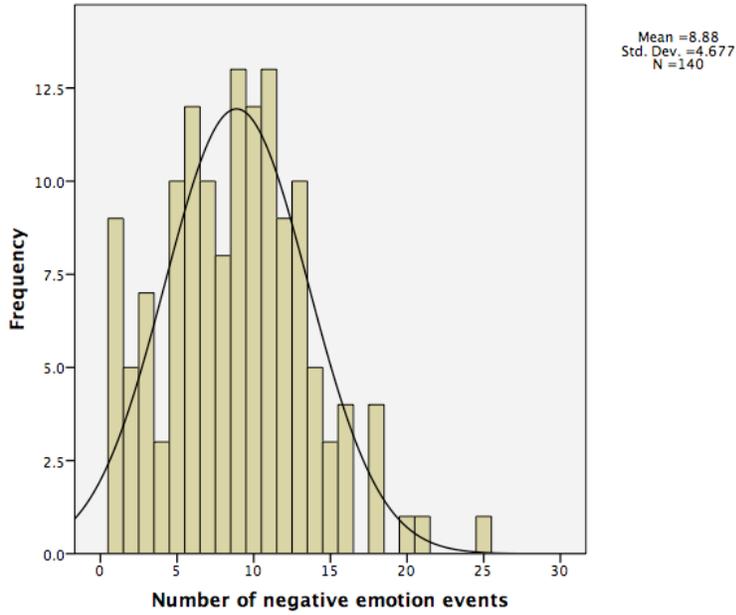
* $p < .05$

** $p < .01$

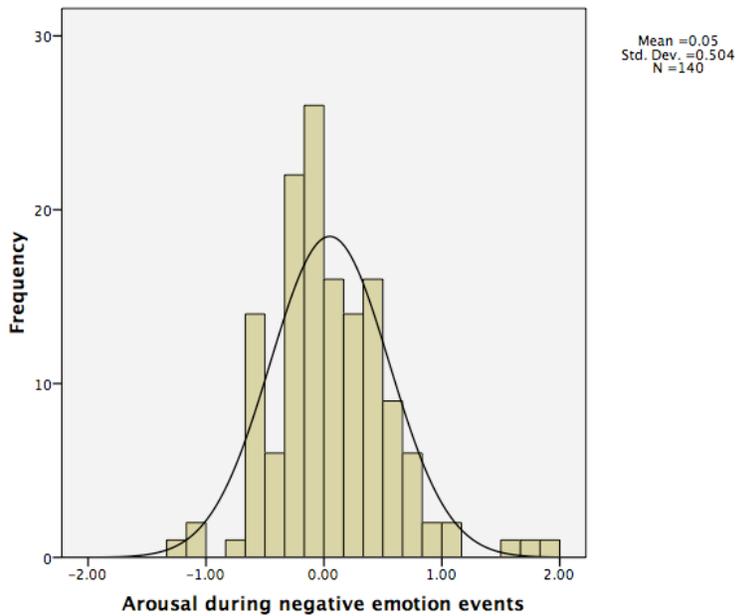
*** $p < .001$

Table B: *Distributions of negative emotion events and arousal during negative emotion events*

Distribution of couples' number of negative emotion events during conflict conversations:



Distribution of couples' arousal* during negative emotion events:



*Arousal reflects the composite of z-score values of emotional experience, behavior, and physiology during negative emotion events, but not the rest of the conversation.

Table C: *Descriptive Statistics for Emotion Regulation Variables for Overall Sample*

	<i>N</i>	Minimum	Maximum	Mean	Standard Deviation
Couple Magnitude*, Composite	139	-1.39	1.98	.003	.53
Couple Magnitude, Experience	140	-1.23	.86	.07	.21
Couple Magnitude, Behavior	140	-.03	.80	.14	.12
Couple Magnitude, Physiology	139	-.53	.27	.01	.09
Couple Duration**, Composite	115	-1.00	-39.25	-9.19	7.50
Couple Duration, Experience	118	-4.40	-129.50	-25.41	17.55
Couple Duration, Behavior	118	-1.83	-82.79	-20.01	14.97
Couple Duration, Physiology	51	-1.00	-10.25	-3.43	2.23

*Z-score values

**Time, in seconds

Table D: *Descriptive Statistics for Emotion Regulation Variables for Husbands and Wives, and Matched-Pair T-Tests*

	<i>HUSB</i>			<i>WIFE</i>			Matched-pair t-test
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	$t(df) = x, p = x$
Couple Magnitude, Composite	132	-.001	.51	132	-.003	.62	$t(131) = .04, n.s.$
Couple Magnitude, Experience	138	.06	.32	138	.09	.26	$t(137) = -.84, n.s.$
Couple Magnitude, Behavior	140	.14	.17	140	.13	.20	$t(139) = .14, n.s.$
Couple Magnitude, Physiology	134	.001	.11	134	.02	.13	$t(133) = -1.44, n.s.$
Couple Duration, Composite	115	-8.12	8.79	115	-10.27	11.24	$t(114) = 1.70, n.s.$
Couple Duration, Experience	118	-23.39	19.93	118	-27.43	30.34	$t(117) = 1.17, n.s.$
Couple Duration, Behavior	118	-17.74	18.15	118	-22.28	20.18	$t(117) = 2.05, p < .05$
Couple Duration, Physiology	51	-3.61	3.14	51	-3.25	3.27	$t(50) = -.56, n.s.$

Table E: Descriptive Statistics for Emotion Regulation Variables for Middle-aged and Older couples, and Independent-Samples T-Tests

	<i>MID-AGE</i>			<i>OLDER</i>			Independent samples t-test
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t(df) = x, p = x</i>
Couple Magnitude, Composite	78	.07	.52	61	-.09	.54	<i>t(137) = 1.73, n.s.</i>
Couple Magnitude, Experience	78	.11	.17	62	.02	.23	<i>t(138) = 2.48, p < .05</i>
Couple Magnitude, Behavior	78	.15	.13	62	.12	.10	<i>t(138) = 1.64, n.s.</i>
Couple Magnitude, Physiology	78	.003	.10	61	.02	.08	<i>t(137) = -1.21, n.s.</i>
Couple Duration, Composite	65	-8.39	7.73	50	-10.23	7.13	<i>t(113) = 1.31, n.s.</i>
Couple Duration, Experience	67	-22.43	18.37	51	-29.32	15.74	<i>t(116) = 2.15, p < .05</i>
Couple Duration, Behavior	68	-19.22	13.72	50	-21.08	16.59	<i>t(116) = .66, n.s.</i>
Couple Duration, Physiology	22	-3.86	2.40	29	-3.10	2.07	<i>t(49) = -1.22, n.s.</i>

Table F: Descriptive Statistics for Comparison of Direct Measures of Emotion Regulation with a Questionnaire Measure of Emotion Regulation

Intercorrelations:

	Couples' Questionnaire-Based Emotion Regulation
1. Couple Magnitude, Composite	.13
2. Couple Magnitude, Experience	.09
3. Couple Magnitude, Behavior	.06
4. Couple Magnitude, Physiology	.06
5. Couple Duration, Composite	.04
6. Couple Duration, Experience	.13
7. Couple Duration, Behavior	.05
8. Couple Duration, Physiology	-.19
9. Couple Marital Satisfaction, T1	.49***
10. Couple Marital Satisfaction, T2	.51***
11. Couple Marital Satisfaction, T3	.60***

* $p < .05$, ** $p < .01$, *** $p < .001$

Questionnaire-Based Emotion Regulation, By Gender:

<i>HUSB</i>			<i>WIFE</i>			Paired samples correlation	Matched-pair t-test
<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	$r = x, p = x$	$t(df) = x, p = x$
47	27.36	18.53	47	34.87	21.00	$r = .37, p = .01$	$t(46) = 2.31, p = .03$

Couples' Questionnaire-Based Emotion Regulation, By Age:

<i>MID-AGE</i>			<i>OLDER</i>			Independent samples t-test
<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	$t(df) = x, p = x$
43	29.50	14.96	41	30.33	22.38	$t(82) = -.20, n.s.$

Table G: Questionnaire Measure of Emotion Regulation – Scale Construction

These items were selected from Couple Communication Questionnaire (Cowan & Cowan, 1990)

1. Scale from “Very Frequently” (1) to “Almost Never” (5)
 - a. I am comfortable with how I express anger to my partner (-)⁸
 - b. I am comfortable with how I express my feelings of depression to my partner (-)
 - c. I am comfortable with how I express my feelings of happiness to my partner (-)
2. Scale from “Very Satisfied” (1) to “Very Dissatisfied” (5)
 - a. In general, how do you feel about the ways you and your partner share your feelings? (-)

These items were selected from Emotion in Close Relationships questionnaire

1. Scale from “Almost Never” (1) to “Almost Always” (7)
 - a. When your sad or depressed feelings have to do with your spouse or your marriage, do you consciously *avoid* talking to your spouse about the way you feel? (-)
 - b. ...Anxious or worried (-)
 - c. ...Disgust or contempt (-)
 - d. ...Angry or upset (-)
 - e. ...Happy or good (-)
 - f. When your sad or depressed feelings have to do with your spouse or your marriage, do you talk (or try to talk) to your spouse about the way you feel?
 - g. ...Anxious or worried
 - h. ...Disgust or contempt
 - i. ...Angry or upset
 - j. ...Happy or good
 - k. When your sad or depressed feelings have to do with your spouse or your marriage, do you find the amount that you talk about these feelings with your spouse helpful?
 - l. ...Anxious or worried
 - m. ...Disgust or contempt
 - n. ...Angry or upset
 - o. ...Happy or good

⁸ The symbol ‘(-)’ signifies that these were reverse-scored to reflect greater emotion regulation.

Figure 1: Univariate LGM for Marital Satisfaction

Univariate latent growth curve model (non-linear) for marital satisfaction. Circles denote latent variables and squares denote observed variables (i.e., marital satisfaction at Time 1 – Time 3). Two-headed arrows represent correlations.

CMARSAT = marital satisfaction at Time 1; CMARSAT2 = marital satisfaction at Time 2; CMARSAT3 = marital satisfaction at Time 3.

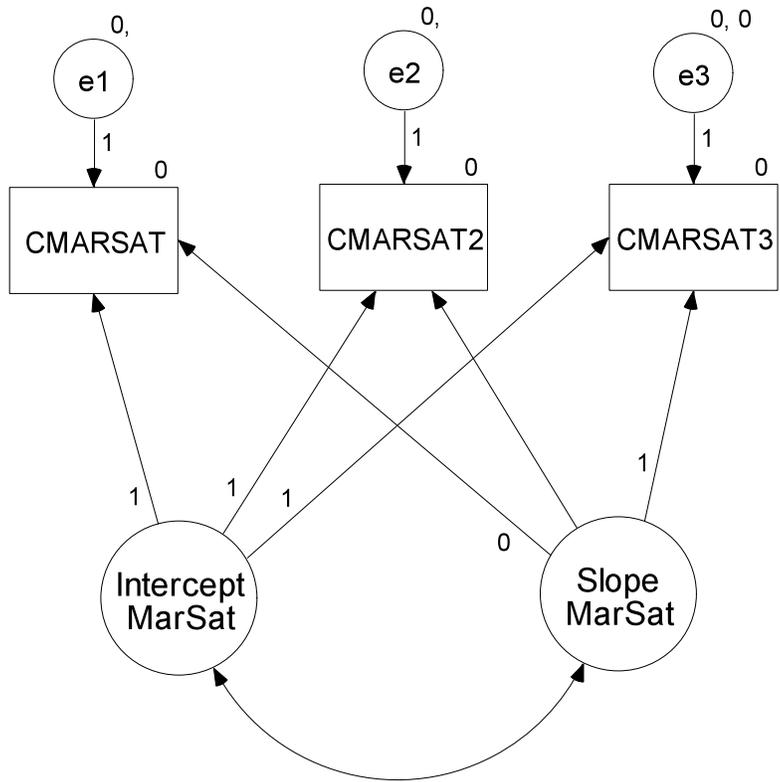


Figure 2. LGM to Test the Association Between Emotion Regulation (Composite) and Marital Satisfaction

Latent growth curve model to test the association between emotion regulation and marital satisfaction. Circles denote latent variables and squares denote observed variables (i.e., two covariates, number of negative emotion events and arousal during negative emotion events, and the composite measure of emotion regulation; marital satisfaction at Time 1 – Time 3). Two-headed arrows represent correlations, and single-headed arrows represent regression paths.

CMarSat = marital satisfaction at Time 1; *CMarSat2* = marital satisfaction at Time 2; *CMarSat3* = marital satisfaction at Time 3.

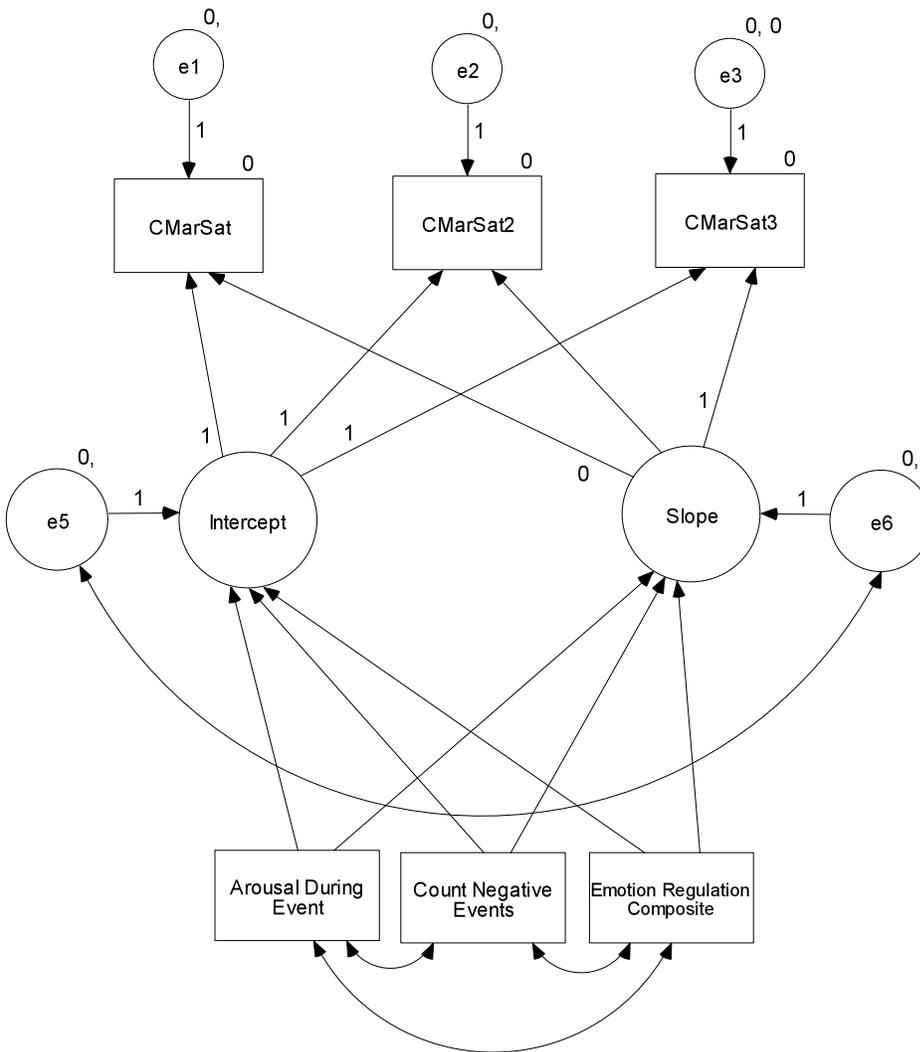


Figure 3. LGM to Test the Association Between Emotion Regulation (Experience, Behavior, and Physiology) and Marital Satisfaction

Latent growth curve model to test the association between emotion regulation component variables (experience, behavior, and physiology) and marital satisfaction. Circles denote latent variables and squares denote observed variables (i.e., two covariates, number of negative emotion events and arousal during negative emotion events, and the three measures of emotion regulation; marital satisfaction at Time 1 – Time 3). Two-headed arrows represent correlations, and single-headed arrows represent regression paths.

CMarSat = marital satisfaction at Time 1; *CMarSat2* = marital satisfaction at Time 2; *CMarSat3* = marital satisfaction at Time 3.

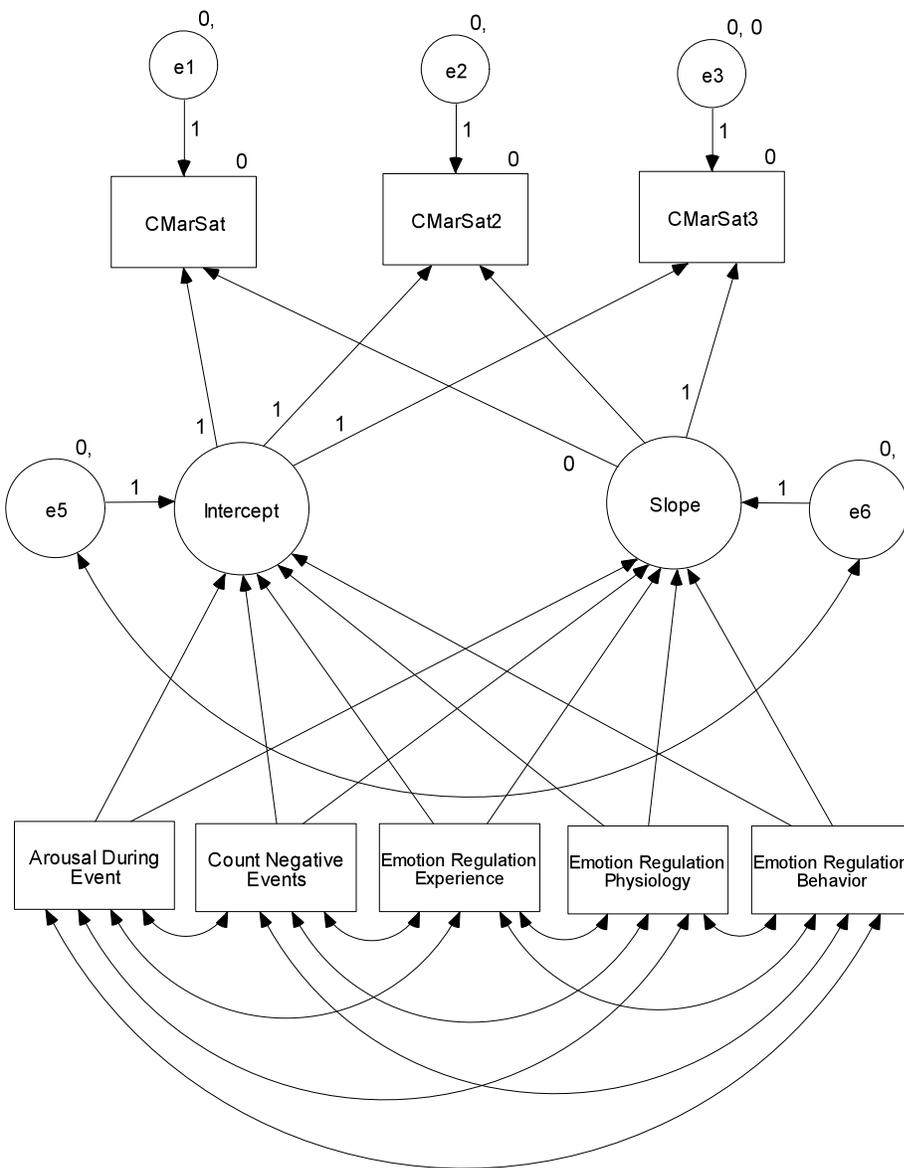
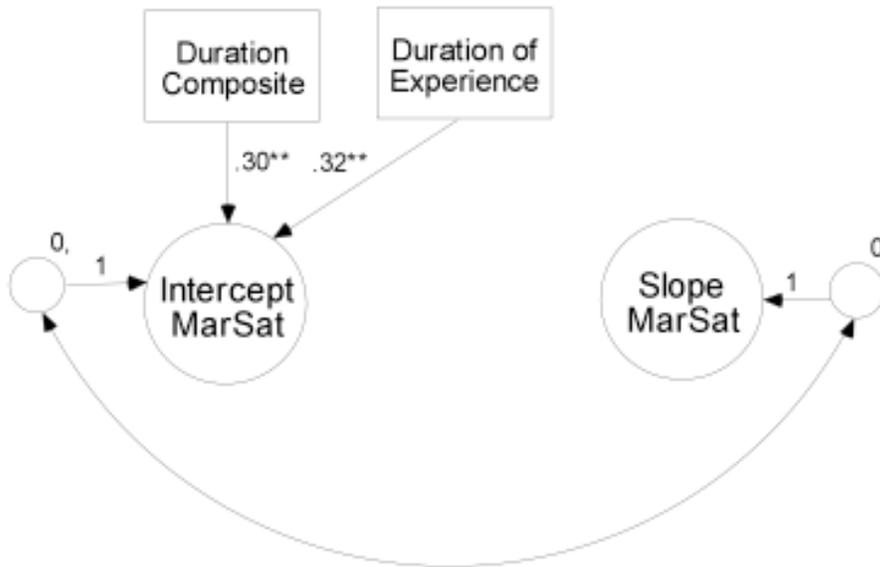


Figure 4. Summary of significant effects of latent growth curve modeling for the duration of emotion regulation

Effects (standardized betas) of the significant covariates on the LGM marital satisfaction intercept and slope. Circles denote latent variables and squares denote observed variables. Two-headed arrows represent correlations, and single-headed arrows represent regression paths.

* $p < .05$
 ** $p < .01$



Moderation by gender:

- Model comparison: $\chi^2(2) = 6.441, p = .04$
- Wives' composite emotion regulation: $B = .386, SE(B) = .126, p = .002$
- Wives' regulation of experience: $B = .170, SE(B) = .047, p < .001$
- Wives' regulation of behavior: $B = .161, SE(B) = .071, p = .024$

Appendix A: Marital Satisfaction of Sample at Each Time Point

	Time 1 (1988)		Time 2 (1995)		Time 3 (2001)	
	Middle-age couples	Older couples	Middle-age couples	Older couples	Middle-age couples	Older couples
N	82	74	67	64	53	48
Mean Satisfaction Score (SD)	109 (16.0)	114 (15.9)	110 (14.8)	114 (16.2)	108 (15.4)	116 (12.5)

Appendix B: Specific Affect Coding System Criteria – Negative Affect Codes

The Specific Affect (SPAFF) Coding System is a culturally-informed coding system used to evaluate affective behavior during marital interaction. SPAFF considers multiple discrete indicators of affective behavior, including voice tone, verbal content, and physical cues. The following is a table containing SPAFF negative affect code criteria (c.f., Coan & Gottman, 2007).

Anger	Frustration, commands, lips pressed together, clenched teeth, yelling or raising the voice.
Contempt	Sarcasm, eye rolls, hostile humor, mockery, insults.
Disgust	Rejection, involuntary aversion, wrinkled nose, mild raising of the upper lip.
Belligerence	Taunting questions, unreciprocated humor, dares. Provocative quality.
Domineering	Incessant speech, glowering, low-balling, invalidation, patronizing, lecturing.
Defensiveness	Communication of blamelessness or victimization via “yes, but...” statements, cross-complaining, excuses, reflecting blame back onto partner.
Fear	Frequent eye movements, speech disturbances, excessive fidgeting or shifting, nervous laughter, voice tone shift between lower and higher pitch.
Sadness	Crying, sighing, slouching, long pauses between words, crying, quavering voice tone.
Whining	A non-defensive complaint; high-pitched voice tone with sing-song quality.

Appendix C: Transcripts from a Couple Demonstrating Greater and Lesser Emotion Regulation

The following are transcripts of the first five minutes of conflict for an *a) couple demonstrating greater regulation* (i.e., demonstrating greater regulation of the duration of their negative subjective emotional experience during conflict) and *b) couple demonstrating lesser regulation* (i.e., demonstrating lesser regulation of the duration of their negative subjective emotional experience during conflict). Select examples of moments within each transcript that reflect key characteristics of greater and lesser emotion regulation during marital conflict, respectively, are indicated in bolded brackets. Please note that simultaneous speech is indicated by no space between lines of text for Husband (H) and Wife (W).

a) Couple Demonstrating Greater Regulation:

W: [laughs] Okay, you can start.

H: [laughs] Am I supposed to talk about your impatience? **[congruent emotional responding]**

W: [smiling] Yes, I guess so.

H: Um, why is it that you feel that I am so patient? [laughs]

W: [laughs] I think one of the places that we have a problem is when we're gonna go on vacation, I want to get up in the morning and get going right away, and you say, oh, there's no use to hurrying [laughs]. It's just the anticipation, I just want to go, I don't want to wait or hold up. I just want to pack the car and go.

H: [smiling] Well, I can appreciate that, but I don't understand why it's so necessary, if we've got two weeks to do something that we've gotta get going in the next 15 minutes. **[acceptance]**

W: [laughs]

W: [laughs] Well, you're not really going until you're gone. Until you set out on the trip.

H: That's only part of it, it's everything that, uh, not everything, but most of the things you like to do you want to do...without really giving a lot of consideration as to what the outcome's gonna be.

W: Well, that's probably true.

H: [smiling; laughing] And I probably, it's the other way around, where I give a little too much, but uh, I think there should be a happy medium some place where... like you say, you're a morning person, you're always ready to get up as soon as the alarm clock goes off, and you're going to full speed by the time you hit the door, and I'm just rolling over and trying to find out what time it is. **[mutual contribution to the problem]**

W: [laughs]

W: Well, and the other extreme too, when I'm tired and ready to tuck in at night, but you're still ready to go.

H: Yea, that's probably because we've got our clocks set backwards

W: Yea, but I think that's probably part of the anticipation, well, the reason I do everything so fast, I don't know. But maybe a lot of it's got to do with the fact that, when I was little, if you sat around, my dad would say, what are you sitting around for? I mean I like to read now, but still lots of times when I'm reading now I still watch television or something else...it seems like if you just sit down and read you're wasting time.

H: You have a hard time relaxing. **[reflecting back]**

W: Yea

H: There are certain things you can do, you can read when you relax, but you never look like the stuff that you read is never stuff you can relax reading – it's always something that you have to try and understand while you're reading

W: Yea, that's true. **[close listening]**

H: It doesn't really seem like it's that much relaxation [smiling]

W: Mmmhmmm [smiling]. Well I still get a lot of pleasure, I usually feel like I should be doing something where I'm learning something or finding out something or I just don't do anything for the pure enjoyment of it.

H: That's where I kinda like to savor my Saturday mornings when I just don't like to jump right out of bed on Saturday morning and start doing something, I like to maybe get going a little later on in the day and just take it easy in the mornings and, uh, just have a day off. I've worked so many Saturdays that, when I get one off, I want it to be like a holiday and take the day off.

W: Mmmhmmm **[close listening]**

W: Yea, I can see that.

W: Well, maybe a good point to consider is on Saturday morning, me sitting up and getting a cup of coffee and reading the paper instead of insisting on having breakfast right away. **[solution]**

H: Well I've never been a breakfast eater anyhow [laughs]

W: [laughs] Yea I know you're not. That's why I know you like to eat later on in the weekends.

b) Couple Demonstrating Lesser Regulation

H: [looking down] Why is it so important for you to have me with you when you go shopping? You can make decisions. **[looking away]**

W: Well for instance, this cruise that is coming up, I don't plan to do much shopping.

H: [looking down] Lets go exploring

W: If we do shop, they say it's kind of dangerous to wander off.

H: [shaking his head] No, Bill Hudson just came back from there and he says you can shop there, but all the things you buy there you can get for half the price back here. The cruise is cheap, he says, but all the things they sell you there makes up for the price of the cruise. **[lack of perspective taking]**

W: You mean on the ship?

H: Everywhere. On the ship, off the ship.

W: They just went to the Carribean?

H: Yes they did

W: Did they do any shopping?

H: [shakes head] No, he wouldn't let Priscilla shop. But all I'm saying is I don't want to be your lackey, to help you carry stuff, stand around waiting for you to buy something, and then I have to carry it. **[isolation of the problem]**

W: [looking down] If you feel that way...

H: Well I mean

W: Most husbands don't...

H: I'm a person, too, I'm an individual, I have likes, I have things that I want to do, and I have things I want to accomplish, it's not necessarily shopping. Like that time we went to Hong Kong, I have no time to explore what I wanted to explore. I had all of those business connections and I never got a chance to collect any of them because I didn't have any time, it takes time to develop those things.

W: The first time we went was because we had requests from people to go shopping, remember, um, Robin asked us to buy a camera lens...

H [interrupting, looking down]: But the thing is I still had connections I wanted to make, so...I didn't have a chance to make business connections and no chance to explore at all. That's why you go shopping, you can make decisions yourself, you don't have to have me around. **[interruption]**

W [interrupting]: Not in Hong Kong, all the husbands went because you can't really go around by yourself.

H [looking down]: Well you can go around with other wives or other people who don't mind shopping, just not me. Sometimes we go shopping, other things I like you don't like, so. I'd rather not have that hassle [laughs]

W: [looks forward, expressionless] **[incongruent emotional responding]**

W: You don't like shopping, but when people ask you after we come home, "How's Korea?", "Oh, the shopping was great," "How's Hong Kong?," "Shopping's great." But you didn't shop! **[accusatory statements]**

H: [looks away] I don't do that

H: Those are the people asked you

W: People asked you, "How did you like Korea," "Oh the shopping was great," but you wouldn't shop [laughs], why would you say that?

H [looking down]: I want to explore.

H: Well that's...

W: You talk a lot, "How was Hong Kong," "Oh the shopping was great..."

H: But that's not a priority

W: You tell people shopping is great but then you don't shop, and you wouldn't let me shop. **[frequent interruption; speaking over one another]**

H: Well, the thing is, you can shop any place. What is there to shop for? You can get the stuff over here.

W: Of course actually when we go on the cruise...

H: I like the haggling [laughs], but I don't like the buying.

W: Well I like to bring something home for each one of the kids or something. And now with little Andrew, if I see something that's unusual...

H: Well, that's something you enjoy, when I'm someplace like that, I want to enjoy what I enjoy, not necessarily what you enjoy, it's just like playing golf, I enjoy golf for many years, and you, you're always angry because I want to relax by playing golf, you'd rather go shopping, and I don't care about shopping. **[absolute statements]**

W: Because the kids buy stuff for us

H: So, you can go shopping your own way and I can go play golf my own way. To me golfing is not shopping.

W: Well I don't like to go shop at the golf clubs

H: Your priority is what people look like on the golf course, not playing golf **[accusatory statements]**

W: Not really. Some of those pro shops, like the one down in Monterey, had some unusual things.

H: All you need is a good set of clubs and a good swing!