IS RECOVERY RATE A USEFUL INDICATOR OF EMOTION REGULATION?

A MASTER THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES AND HUMANITIES
OF
KOÇ UNIVERSITY

BY

HİLÂL ŞEN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF ARTS
IN
PSYCHOLOGY

AUGUST 2010

Koç University

Graduate School of Social Sciences and Humanities

This is to certify that I have examined this copy of a master's thesis by

Hilâl Şen

and have found that it is complete and satisfactory in all respects,
and that any and all revisions required by the final
examining committee have been made.

Committee Members:

Assoc. Prof. Dr. Nazan Aksan (Koç Uni, Psychology)

Assoc. Prof. Dr. Bilge Yağmurlu (Koç Uni, Psychology)

Assoc. Prof. Dr. Feyza Çorapçı (Boğaziçi Uni, Psychology)

Date: 06 / AUGUST / 2010

STATEMENT OF AUTHORSHIP

This thesis contains no material which has been accepted for any award or any other degree or diploma in any university or other institution. It is affirmed by the candidate that, to the best of her knowledge, the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Signed  Hilâl Şen

ABSTRACT

IS RECOVERY RATE A USEFUL INDICATOR OF EMOTION REGULATION?

Hilâl Şen
M. A., Department of Psychology
Supervisor: Assoc. Prof. Nazan Aksan
August 2010, 91 pages

The aim of the current study was to investigate whether behavioral measures of anger and sadness recovery following the offset of the emotion eliciting tasks were an indicator of emotion regulation. Recovery responses were explored in relation to various broadly conceived measures of emotion regulation. The sample consisted of 67 mother-child dyads. Children's reactivity and recovery responses were assessed in three different tasks drawn from Laboratory Temperament Assessment Battery (PS-LAB-TAB; Goldsmith, Reilly, Lemery, Longlet, & Prescott, 1995). The tasks divided into baseline, active elicitation, and recovery phases to characterize the time course of emotional responses following the affective chronometry approach (Davidson, 1994). Children's effortful control was measured through behavioral batteries, adherence to display rule was measured by the Disappointing Gift Paradigm, behavioral problems was rated by mothers via MacArthur Health and Behavior Questionnaire, and emotion regulation functioning was measured through teacher-rated Emotion Regulation Checklist. The results were partially supportive of a coherent response profile consistent with either affective style or temperament. Sadness reactivity and recovery showed coherent pattern consistent with affective style. In addition, a trait-like property for emotional recovery observed when both smiling and sadness were considered. Finally, the findings in relation to external validity measures signified that positive affect during recovery phase was associated with adherence to display rule and both positive affect and sadness recovery were related to effortful control. The overall findings suggested that the situational variance in tasks dominated trait variance in both reactivity and recovery measures.

Keywords: reactivity, recovery, behavioral measures, affective chronometry, affective style

ÖZET

TOPARLANMA HIZI, DUYGU DÜZENLEMENİN GÖSTERGESİ OLABİLİR Mİ?

Hilâl Şen
Yüksek Lisans, Psikoloji Bölümü
Danışman: Doç. Dr. Nazan Aksan
Ağustos 2010, 91 sayfa

Bu çalışmanın amacı, duygusal tepki çıkarma amaçlı görevler sonrası öfke ve üzüntü duygularında toparlanmanın duygu düzenlemenin bir göstergesi olup olmayacağını incelemektir. Toparlanma tepkilerinin, literatürde duygu düzenleme amaçlı kullanılan diğer ölçüm araçlarıyla olan ilişkisi incelenmiştir. Araştırmaya 67 çocuk-anne çifti katılmıştır. Çocukların tepkisellikleri ve toparlanma tepkileri üç farklı görevle ölçülmüştür. Duyuşsal kronometri (Davidson, 1994) yaklaşımına uygun olarak duygusal tepkilerin zaman seyrini görebilmek için görevler temel düzey, aktif ortaya çıkarma ve bilgilendirme olmak üzere üçe bölünmüştür. Çocukların kendini denetleme becerileri davranış bataryalarıyla, gösterim kurallarına bağlılıkları Hayalkırıklığı Yaratan Hediye Paradigmasıyla, davranışsal sorunları annelerin doldurduğu MacArthur Sağlık ve Davranış Anketiyle, duygu düzenleme becerileri ve duygu düzenleme güçlükleri de öğretmenlerinin doldurduğu Duygu Düzenleme Ölçeği ile ölçülmüştür. Bulgular, duyuşsal tarz veya mizaçla uyumlu olacak tutarlı tepki profillerini kısmi olarak desteklemiştir. Üzüntü tepkiselliği ve toparlanması, duyuşsal tarzla uyumlu bir örüntü göstermiştir. Ayrıca, duygusal toparlanmada mizaç-benzeri özellikler sadece üzüntü ve tebessüm birlikte ele alınınca görülmüştür. Dış geçerlilik amacıyla kullanılan ölçüm araçlarıyla ilişkileri incelendiğinde, toparlanma fazında olumlu duyuşun gösterim kurallarına bağlılıkla, hem olumlu duyuşun hem de üzüntüden toparlanmanın kendini denetleme becerileriyle ilişkili olduğu bulgulanmıştır. Genel olarak, çalışmanın sonuçları hem tepkisellik hem de toparlanma ölçümlerinde, durumsal varyansın (görevlere has özelliklerin) mizaç-benzeri tutarlı davranış örüntüsüne göre baskın geldiğini göstermiştir.

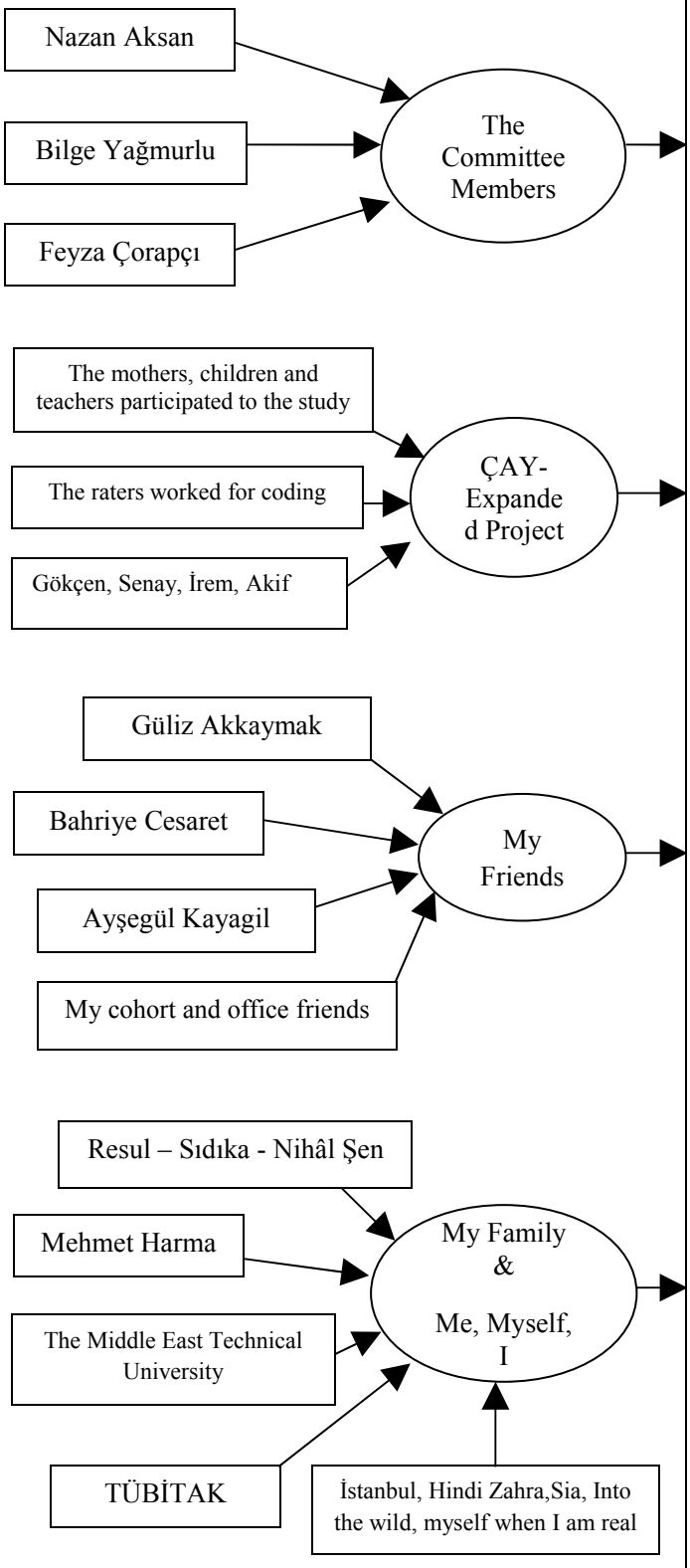
Anahtar Sözcükler: tepkisellik, toparlanma, davranışsal ölçümler, duyuşsal kronometri, duyuşsal tarz

DEDICATION

To my beloved parents, Resul and Sıdıka,

ACKNOWLEDGEMENTS

The **S**ocio-**E**motional **M**odeling (SEM) of the Thesis



INTRODUCTION

I would like to thank to my super-heroine-advisor Nazan Aksan for her patience, guidance and assistance, emotional support and humanism throughout this academic journey. She has taught me how to be critical, analytical, and creative. I am grateful for your time and never-ending energy on this thesis and beyond…

I am also deeply thankful to my other committee members, Bilge Yağmurlu and Feyza Çorapçı, for their invaluable contributions and support to this thesis and my academic works.

METHOD

I am grateful to Gökçen and the coders for their super-energy in the entire process of the data collection and coding processes. I also thank to Senay, İrem, and Akif for their support in time of the need. It was impossible to complete this thesis without your efforts.

RESULT

I would like to express my deepest thanks to Güliz, Ayşegül, and Bahriye…You are always right beside me in time of crisis and provide unconditional and lasting emotional and social support. I specially thank to Güliz for her genuine sisterhood during our time in Istanbul and making my life so wonderful! Now, all you are leaving but I know you will be always beside me…

DISCUSSION

Above all, my most special thanks go to my beloved secure bases, Resul-Sıdıka-Nihâl, from which I explore the world and to which I return easily. You are always supportive of, helpful and heartening to me…

I tender my thanks to my dearie Mehmet for sharing all good and bad times with me. Your never-ending genuine support and unconditional love help me survive throughout this progress and beyond…

Finally, I thank to TÜBİTAK for financial assistance, all my professors in the Middle East Technical University and others who inspired me to be my own self...

"There is a pleasure in the pathless woods
There is a rapture on the lonely shore
There is a society, where none intrudes
By the deep sea and music in its roar
I love not man the less, but Nature more…"
Lord Byron

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

The aim of the current study was to examine whether recovery rate from anger and sadness in tasks typically designed to elicit those emotions was an indicator of emotion regulation. This question was explored in relation to various broadly conceived measures of emotion regulation, including effortful control, teacher ratings of emotion regulation and dysregulation, maternal ratings of behavior problems, and display rule use competency. In addition, age and gender differences in recovery rate for anger and sadness were explored.

Recovery rate was discussed in the affective chronometry framework of Davidson (1998). Poorer recovery rate, or recovery function, can be a vulnerability factor for the development of psychopathology (Davidson, 2004) because a slower rate of recovery following an emotional challenge might indicate the deficiencies in emotion regulation. In other words, longer recovery rate might be an indicator of lack of flexibility or difficulties in controlling emotional reactions in response to changing environmental demands.

Previous studies examining recovery rate in relation to emotion regulation mostly relied on physiological assessments following the offset of the emotion eliciting stimuli (e.g., Jackson et al., 2003). In the current thesis, recovery rate was examined by using *behavioral* measures in preschoolers. At the end of typical emotion eliciting tasks drawn from Preschool LAB-TAB (Goldsmith, Reilly, Lemery, Longley, & Prescott, 1995), i.e., yarn, end of the line, and impossibly perfect circles, children were debriefed. The goal of those debriefing phases was to give the child an age-appropriate rationale for the recent "event" (i.e. task) and to help them calm down. Although debriefing statements are standard components of assessments, their effectiveness in children's actual recovery to baseline, and the extent of individual difference variability in behavioral recovery rates and whether the observed levels of recovery

relate meaningfully to other more commonly used indices of emotion regulation have not been investigated.

Behavioral measures of recovery rate was paralleled the robust measurement approach utilized to characterize overall emotional reactivity during the emotion-eliciting task. The overall emotional response during and the 60 seconds following the end of the debriefing statement was characterized by using multiple parameters of emotional response, i.e., latency to show first anger and sadness, latency to lowest intensity anger and sadness down, duration of anger and sadness, and intensity of anger and sadness. The overall level of reactivity in anger and sadness during the debriefing phase was compared to the corresponding composite reactivity measures during the task to compute a recovery score.

The first section of the thesis discussed various conceptualizations of emotion regulation dominant in the literature before examining the notion of recovery rate as a specific indicator of emotion regulation. In the second section, questionnaires and observer measures used as external validity measures were introduced. In the last section, hypotheses of the study were listed.

Emotion Regulation

Definition and Conceptualization

The topic of emotion regulation has received considerable attention during last decades. Its role in adaptive and maladaptive functioning has been reported in many studies (Eisenberg et al., 2001; Keane & Calkins, 2004; Keenan, 2000). Although emotion regulation plays a central role in discussions of children's adjustment, there is a lack of consensus on its measurement owing in part to different conceptualizations of the construct.

The view adopted in the current thesis concerning emotion regulation was in the tradition of Thompson's classic definition as "extrinsic and intrinsic processes responsible for

monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (1994, pp.27-28). In this view, emotions are targets of regulation and thus emotion regulation is a "change" in the intensive and temporal features of the activated emotions (Goldsmith & Davidson, 2004).

Discussions concerning the conceptualization of emotion regulation mostly arise from the difficulty in the independent assessment of emotion regulation from the emotion process itself. On the one side, researchers argue that emotions, themselves, have a self-regulatory role in that emotions help individuals to organize their own reactions to dynamic changes in the environment to promote effective pursuit of goals. Hence, emotion regulation processes are embedded in the emotion process itself (Lewis & Stieben, 2004, p.372). For example, fear is associated with a unique set of facial and bodily actions that prepare the organism to deal with the fear-eliciting situation. Withdrawal behavior, an action tendency associated with fear, may help to remove the individual from the fear-eliciting event and terminate the experience of fear. In this sense, activated emotions have their own regulatory function (Campos, Mumme, Kermoian, & Campos, 1994).

On the other side, researchers argue that emotions are also targets of regulation (Thompson, 1994; Gross, 1999; Eisenberg & Spinrad, 2004). In this view of emotion as targets of regulation, emotion regulation refers to "changes in the activated emotions" (Cole, Martin, & Dennis, 2004, p.321). Behaviors that modulate emotional reactions are indicators of emotion regulation. Thompson (1994) explained this aspect of emotion regulation as follows:

> In other words, aspects of emotion management subdue (enhance) the intensity of experienced emotion, retard (or speed) its onset or recovery, limit (or enhance) its persistence over time, reduce (or

> increase) emotion range or lability, and affect other qualitative features of emotional responding. (p.29)

Researchers focusing on emotions as targets of regulation have tried to identify strategies that are effective in emotion regulation (Harman, Rothbart, Posner, 1997; Buss & Goldsmith, 1998; Gross, 1999; Gross & Thompson, 2007). For example, Gross and Thompson (2007) proposed strategies that can be grouped into two major classes: antecedent-focused emotion regulation and response-focused emotion regulation. The former covers four emotion regulation strategies, which are situation selection, situation modification, attentional deployment, and cognitive change. These strategies are set in motion before the occurrence of emotional responses. Response-focused emotion regulation emerges after emotional responses and covers response modulation actions such as suppression.

In studies with infants, researchers tried to understand the role of regulatory behaviors in dampening emotional reactivity and its relation to social behaviors. For example, Stifter and Braungart (1995) investigated four classes of regulatory behaviors including avoidance, orientation, self-comforting, and communicative behaviors during tasks that elicited negative affect. The aim was to understand whether those behaviors were useful in altering emotional arousal. The findings suggested that self-comforting, defined as finger- and thumb-sucking, and the clasping or pulling on hands or feet, had a regulatory function in dampening negative reactivity for both 5 and 10 month olds. Similarly, orienting behaviors such as object orientation or mother orientation were also successful at reducing negative affect of mildly distressed infants.

The significance of self-soothing and orientation along with distraction in social development of toddlers was also reported (Calkins, Gill, Johnson, & Smith, 1999). The regulatory behaviors investigated in this study were self-orienting (i.e., thumb-sucking), mother-orientation (i.e., reaching to mother, asking mother for help), distraction (i.e.,

reorienting to another object), aggression/venting (i.e., kicking, banging, throwing), and orienting to focal object. The researchers showed that among the children who showed distress in frustration tasks, children who used high venting or orienting to focal object strategies were engaged in more conflict behaviors with peers compared to children who used distraction, mother-orientation or self-focused strategies, indicating the adaptive regulatory role of distraction, self-soothing, and mother-orientation in the social development of children.

However, other findings concerning the regulatory function of behaviors in modulating emotional arousal revealed that some behaviors were not sufficient to overcome emotional distress. For example, Harman and colleagues (1997) found that distraction, as a soothing technique, was successful at reducing distress of infants between 3 and 6 months of age but only during the presence of distractor. In other words, as soon as the distraction period ended, previous levels of distress returned. This evidence is often interpreted to mean that putatively regulatory behaviors such as distraction can be ultimately ineffective in soothing distress.

In an attempt to investigate the sequential relation between putative regulatory behaviors and changes in emotional expression, Buss and Goldsmith (1998) adopted the chronometric approach to study whether changes in emotional expressions were a function of regulatory behaviors in close temporal proximity. In this sense, researchers examined temporal dynamics of anger and fear expressions following putative regulatory behaviors. Those behaviors were disengagement of attention (i.e., gaze aversion, distraction), approach/withdrawal (e.g., physical reaching toward the stimulus for approach, and moving away from stimulus for withdrawal), social behaviors (i.e., looking to mother, and looking to experimenter), interacting with the stimulus, and redirecting attention (e.g., repetitive manipulation of body part or clothing). The results indicated that putative regulatory

behaviors were effective in reducing anger expressions, yet were not successful at reducing fear expressions. Particularly, all five behaviors (reaching for toy, interaction with the stimulus, distraction, looking to mother, and looking to experimenter) were effective in reducing anger expression in Barrier episode at 12 and 18 months. In Arm Restraint episode, all behaviors except looking to mother were associated with decrease in anger expression at 12 and 18 months. However, the relevance of regulatory behaviors to fearful distress was not apparent. Only withdrawal was found to be effective in preventing further fear intensity and maintaining the same distress level in one of the fear-eliciting contexts, the Dog episode.

A more recent shift in operationalization of emotion regulation involves the extent to which expressive behaviors conform to the prevailing display rule in a given context. For example, in the disappointing gift paradigm (Saarni, 1984), children were presented with an undesirable gift (e.g., broken or baby toys) and their ability to mask disappointment after receiving the gift were observed. Saarni (1984) reported that 10 year-old children were better at exhibiting positive reactions such as smiling after receiving the undesirable gift. Similarly, Cole (1986) reported that children aged between 3 and 4 were able to hide their negative reactions and display positive reactions. Carlson and Wang (2007) explored display rule in both negative (disappointing gift) and positive (secret keeping) contexts. Their findings showed that the parental reports of emotion regulation was negatively correlated with display rule use in disappointing gift paradigm while no association was observed between positive display rule and emotion regulation ratings. This finding might indicate the relative significance of display rule use in negative emotion eliciting contexts to emotion regulation.

As the review above indicated, previous operationalizations of emotion regulation focused on putatively regulatory strategies or display rule use. The goal of this study was to investigate whether recovery from emotional challenge involving anger and sadness eliciting

contexts was an indicator of emotion regulation. In the next part, recovery rate was discussed under the rubric of affective chronometry.

Affective Chronometry and Emotion Regulation

Affective style, introduced by Davidson (1998), refers to the study of individual differences in affective reactivity. Inter-individual differences variability in emotional reactivity during emotion-eliciting events are typically characterized with parameters of emotional response such as threshold for reactivity (i.e., latency to first reaction), peak or amplitude of response, latency to peak response, and recovery function (Davidson, Jackson, & Kalin, 2000; Davidson, 1998, 2004). Individuals may differ in their reactions to eliciting components of a particular emotion such that some people might need more intense stimulus, while others might show reactions to less intense stimulus. Peak or amplitude of the response refers to peak intensity observed in reactions. Latency to peak response or rise time captures how quickly individuals reach peak intensity of response. Recovery function or recovery time refers to recovering to baseline or neutral affect following an emotion-provoking situation.

Those time-dependent parameters, such as latency to peak response and recovery from peak to baseline or neutral affect, are important components of the affective chronometry perspective to the study of emotion regulation (Davidson, 1998; Goldsmith & Davidson, 2004). In particular, individual differences in recovery functions, e.g. recovering from peak intensity, should capture the capacity to diminish negative emotions once they are activated (Davidson et al., 2000) and it is thought to be associated with emotion regulation (Davidson, 2004). Previous studies have examined recovery function in relation to neural substrates (Jackson et al., 2003) and personality (Hemenover, 2003) with adolescents and adult participants.

For example, Jackson and colleagues (2003) showed that individual differences in baseline prefrontal asymmetry were associated with recovery from negative affect-elicitor. In that study, participants were presented with emotionally arousing and neutral pictures. Researchers also presented startle probes both during and following the offset of emotional stimulus, while the eyeblink startle magnitude of the participants were recorded. Findings revealed that left-sided resting frontal activation predicted faster recovery from negative emotional stimulus, indicating that baseline prefrontal asymmetry differences were associated with the duration of negative affect following the termination of picture presentation.

Hemenover (2003) examined the relation between personality and rate of affect changes. Participants watched videos designed to elicit global negative, positive, and neutral effects. They rated their affective state by completing PANAS at the beginning of the session (baseline), after watching videos (T_1), and after completing an irrelevant questionnaire following the videos, which took approximately 20 min (T_2). Findings of the study showed that the decay of negative affect was slow and the decay of positive affect was fast for neurotic individuals, while the pattern was reversed for extraverts (the decay of negative affect was fast and the decay of positive affect was slow). The difference between neurotics and extraverts in terms of the recovery time from affective videos may indicate the differences in their emotion regulation processes.

Recovery function has not been examined in children using behavioral measures either as an indicator of emotional reactivity or emotion regulation. In this thesis, three episodes from preschool LAB-TAB (Goldsmith et al., 1995) designed to elicit anger and sadness were administered. At the end of each task, children were debriefed. Children's emotional expressions were coded during 60 seconds following debriefing. The goal was to examine the potential utility of recovery function as an indicator of emotion regulation. Measures of external validity included teacher ratings of emotion regulation, maternal ratings of behavioral

problems, observer measures of effortful control and display rule use. Those measures were discussed next.

External Validity Measures

Questionnaires: Emotion Regulation Checklist and MacArthur Health and Behavior Questionnaire-Parent Version

Emotion Regulation Checklist (ERC)

Similar to Thompson's (1994) conceptualization of emotion regulation, Cicchetti and colleagues (1991) defined emotion regulation as "the intra- and extraorganismic factors by which emotional arousal is redirected, controlled, modulated, and modified to enable an individual to function adaptively in emotionally arousing situations" (p.15). Based on this definition, Shields and Cicchetti (1997) introduced a new emotion regulation checklist that covered the behavioral manifestations of emotional processes such as mood lability, flexibility in emotional responses, and situational appropriateness.

Rather than focusing on the process of how emotions are regulated, the checklist aims to differentiate between manifestations of adaptive emotion regulation and maladaptive regulation or emotion dysregulation (Shields & Cicchetti, 1997). The Emotion Regulation subscale includes the items that tap context appropriate displays of both positive and negative emotions, whereas the Lability/Negativity subscale includes the items tapping emotion dysregulation such as context inappropriate manifestations of emotional experience and lack of flexibility both in positive and negative emotions. If behavioral measures of recovery rate were an indicator of emotion regulation, they were expected to predict ERC subscales.

MacArthur Health and Behavior Questionnaire-Parent Version (HBQ-P)

The MacArthur Health and Behavior Questionnaire was designed to assess behavioral problems of preschool children (Essex, Boyce, Goldstein, Armstrong, Kraemer, & Kupfer,

2002) under two-higher factors, which are internalizing and externalizing problems. These two broadband scales are believed to reflect failures and deficiencies in emotion regulation such as problems in controlling emotions in addition to conduct (Spinrad, Eisenberg et al., 2007).

The studies examining the role of emotion regulation in behavior problems of children have relied on physiological markers as an indicator of emotion regulation. Specifically, respiratory sinus arrhythmia (RSA) is considered as an important facet of individual differences in regulation. RSA is an index of vagal tone parasympathetic control of cardiac reactivity that facilitates behavioral and physiological flexibility (Porges, 1992). High resting RSA has been associated with positive emotional functioning and competency.

Studies concerning the function of RSA activity in emotion regulation generally compared baseline RSA to RSA during and after an emotion-eliciting task. Healthy functioning of RSA system is associated with decreased activity in RSA during demanding tasks and increased RSA activity following the offset of tasks (Porges, 1997). In line with this notion, studies with children showed that context-dependent changes in RSA predicted behavioral problems. In those studies, internalizing and externalizing behavior problems were assessed by another widely used Child Behavior Checklist (Achenbach, 1991). For example, Porges and colleagues (1996) recorded 9-month infants' RSA during the administration of Bayley test that included attention-demanding tasks. Mothers rated their children's behavioral problems when their children were 3 years old. The findings showed that infants with decreases in RSA during test administration at 9 months of age had fewer behavioral problems at age 3. Similarly, Calkins and Keane (2003) observed that 2-year old children who were high on RSA suppression during attention-demanding task had fewer externalizing problems at age 4.5.

Gottman and Kantz (2002) found that the children high in basal vagal tone showed a decrease in heart rate activity when they were exposed to maternal criticism. In addition, the researchers reported that those who were high in basal vagal tone were also able to recover more quickly following the criticisms than children low in vagal tone baseline, which may indicate the better use of emotion regulation strategies. Indeed, Santucci and colleagues (2008) showed that vagal recovery was associated with emotion regulation strategies. Faster vagal recovery following the offset of M & M task was associated with lower levels of display of sadness and anger, and lower levels of focusing on delay object.

Those findings supported the role of RSA suppression during emotional challenge in relation to behavioral problems and the relevance of recovery to emotion regulation strategies, but did not indicate a role for RSA following the offset of emotional challenge in relation to behavioral and emotional problems in preschoolers. In contrast, RSA function following the offset of emotion challenge was meaningfully related to adult depression. Rottenberg and colleagues (2003) reported that depressed adults failed to show an increase in RSA following the offset of a sad film designed to induce crying. In other words, depressed adults who cried during the sad film failed to elevate RSA after the resolution of crying, indicating the deficiencies in recovery function from the emotional burden among depressed adults. A similar finding also suggested that depressed adults were also more likely to maintain affective responding following the offset of unpleasant stimulus as indicated by sustained pupil dilation, an indicator of continued cognitive and emotional processing, after presentation of negative and personally relevant emotional stimulus (Siegle, Steinhauer, Carter, Ramel, & Thase, 2003).

Those findings indicated that physiological measures during and following the offset of emotion challenge was associated with symptoms of psychopathology. It is possible that observed behavioral measures of recovery function following the offset of emotional

challenge is also useful in understanding risk for psychopathology. The goal of this thesis was to explore those relations. It was predicted that those children who were fast in recovery rate following debriefing in anger and sadness-inducing tasks were rated as low in externalizing and internalizing problems by their mothers.

Observer Measure: Effortful Control

Effortful Control: Conceptualization and Measurement

Effortful control was introduced by Rothbart and her colleagues (Rothbart & Ahadi, 1994; Rothbart & Bates, 1998) as a major branch of temperament and is defined as the ability to inhibit a dominant response to perform a subdominant response (Rothbart & Bates, 1998). The concept has gained considerable attention during the last years due to its organizing role on social and emotional functioning of children (Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996; Kochanska, Murray, & Coy, 1997; Murray & Kochanska, 2002; Rothbart & Ahadi, 1994; Rothbart & Bates, 1998).

Rothbart defines temperament as constitutionally based individual differences in emotional reactivity, motor and attentional regulation (Rothbart & Derryberry, 1981; Rothbart & Bates, 2006). According to this view, temperament has two important aspects: reactivity and self-regulation. *Reactivity* aspect refers to emotional responsivity and arousability; while *regulation* refers to control of attentional and motor behavior. Factor-analytic work with Rothbart's Children's Behavior Questionnaire (Rothbart, Ahadi, Hershey, & Fisher, 2001) supported those distinctions. Two factors captured reactivity in positive affect (Extraversion/surgency) and negative affect (Negative Affectivity). Effortful control was the third factor and was comprised of inhibitory control, attentional control, low intensity pleasure, and perceptual sensitivity.

Based on Rothbart's conceptualization of effortful control, Kochanska and her colleagues (1996) developed a multi-task battery to assess effortful control. Those batteries emphasize the attentional and inhibitory components, believed to be the most robust elements of the CBQ effortful control factor (Rothbart & Bates, 1998). The behavioral tasks are typically grouped under four components of effortful control, which were delaying, slowing down motor activity, suppressing/initiating activity to signal, and lowering voice. *Delaying* is typically observed with tasks that assess the ability to wait for pleasant events such as waiting to eat a snack or gift. *Slowing down motor ability* is assessed with tasks designed to assess the ability to slow down fine and gross motor responses such as the turtle-and-rabbit. *Suppressing/initiating activity to signal* is measured with tasks such as the tower task in which suppressing a dominant response in order to perform a subdominant response is observed. Lastly, *lowering voice* is measured by whisper kind of tasks to assess the ability to whisper the names according to the given instruction.

Developmental Changes and Gender Differences in Effortful Control

As children grow older, their effortful control abilities become more mature, stable and coherent (Kochanska et al., 1996, 1997). The development of effortful control begins during the first year of life, yet important improvements in effortful control skills continued to be observed throughout the preschool years (Posner & Rothbart, 2000; Rothbart & Posner, 2005). For example, children begin to control their attention flexibly, which enables them to focus or shift easily or they begin to inhibit their prepotent responses voluntarily.

In a variety of studies, Kochanska and her colleagues (1996, 1997, 2000, 2003) showed that as children grew older; their effortful control abilities increased and gained a trait-like quality. Similar marked improvements in effortful control tasks were also reported by Carlson and Wang (2007), indicating that children's performance on effortful control tasks improved significantly over time and became highly coherent.

In terms of gender differences, previous works have consistently showed that girls scored higher than boys did on the factor of effortful control by a standard deviation, indicating that girls were better at inhibiting a dominant response to perform a sub-dominant response (Else-Quest, Hyde, Goldsmith, & van Hulle, 2006). Particularly, gender differences were observed in attention focusing, attention shifting, and inhibitory control dimensions of Rothbart's conceptualization of effortful control. There are other findings favoring the better performance of girls than boys in effortful control (Ahadi, Rothbart, Ye, 1993; David & Murphy, 2007; Kochanska et al., 1996, 1997, 2000).

In a nutshell, empirical findings supported the notion that as age increased, effortful control abilities showed marked improvements. In addition, girls performed better than boys did on effortful control tasks.

Regulatory Function of Effortful Control

Because effortful control is defined as the capacity to inhibit a dominant response to perform a sub-dominant response (Rothbart & Ahadi, 1994; Rothbart & Bates, 1998; Posner & Rothbart, 2000), it is believed to give flexibility to behavioral and emotional responses, and to facilitate the individual's adaptation to the changing requirements of the environment. It gives "some freedom from affectively driven behavior" (Rothbart, Ellis, Rueda, & Posner, 2003, p. 1115) and helps with effective coping strategies (Karreman, van Tuijl, van Aken, & Dekovic, 2009). Therefore, effortful control is believed to be a hallmark of healthy adaptation.

Evidence generally has supported the regulatory effects of effortful control. Individual differences in effortful control have been linked to socioemotional outcomes (Kochanska et al., 1997) including low behavioral problems (Kochanska & Knaack, 2003; Karreman et al., 2009), high social competence (Eisenberg, Fabes et al., 1997), high internalized conduct

(Kochanska et al., 1997; Kochanska, Coy, & Murray, 2001), and high prosocial behaviors (Eisenberg, Fabes et al., 1996).

The studies considering the relevance of effortful control to behavioral problems showed that deficits in effortful control were a predictor of externalizing problems (Murray & Kochanska, 2002; Eisenberg, Zhou, Spinrad, Valeinte, Fabes, & Liew, 2005; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Valiente et al., 2006; Lemery-Chalfant, Doelger, & Goldsmith, 2008). In contrast, the association between effortful control and internalizing problems appeared less consistent. On the one hand, there are studies showing that lower scores on effortful control predicted high levels of internalizing problems (Eisenberg, Ma, Chang, Zhou, West, & Aiken, 2007; Lemery-Chalfant et al., 2008). On the other hand, there are studies reporting that high levels of effortful control were related to elevated levels of internalizing problems in adolescents (Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996; Huey & Weisz, 1997) and children (Murray & Kochanska, 2002). Those findings suggested that there may be a U-shaped quadratic relation between effortful control and externalizing and internalizing problems such that low and high levels of effortful control were associated with externalizing and internalizing behavior problems, respectively. Hence, moderate levels of effortful control predicted healthy adjustment.

Effortful control is also considered to play a role in emotion regulation. There are two classes of evidence supporting this notion. First, there are studies showing the moderating role of effortful control in relation between reactivity and behavioral problems, indicating the role of effortful control in emotion-related regulation (Eisenberg, Ma, Chang, Zhou, West, & Aiken, 2007). For example, it was reported that high attentional control and inhibitory control in combination with low impulsivity and negative emotionality was related to low levels of externalizing problems in another study (Eisenberg, Valiente, et al., 2009).

Second, there are studies revealing relatively more direct evidence of effortful control's role in expressive control of both negative and positive emotions (Bodner, 2007; Carlson & Wang, 2007; Kieras, Tobin, Graziano, & Rothbart, 2005). Carlson and Wang (2007) reported that children who scored high on effortful control were better at suppressing negative expressions in the disappointing gift task even after controlling their age and verbal ability. Kieras and colleagues (2005) found that greater effortful control predicted similar levels of positive affect after receiving desirable and undesirable gifts in 3- to 5-year-old children. In contrast, lower effortful control was only associated with positive affect after receiving desirable gift.

Those findings were typically thought to support the emotion regulatory function of effortful control. If recovery function was an indicator of emotion regulation, then it was expected to be positively correlated with effortful control.

The Current Study

The aim of the current thesis was to examine the rate of recovery from two discrete angry and sad states in three contexts, designed to elicit those emotions, during and after the debriefing process as a potential measure of emotion regulation. External validity measures included both questionnaire and observer measures. Teachers provided ratings on emotion regulation and dysregulation, mothers provided ratings on HBQ symptoms and observers rated effortful control with a multi-task battery and children's display rule use during the disappointing gift paradigm. Following hypotheses were derived based on the literature reviewed above.

Hypotheses of this section were exploratory because there has not been a growing body of evidence in childhood literature. Therefore, exploratory research questions regarding the recovery rate were as follows:

1. Were there age and gender differences in recovery rate for anger and sadness in each task? This was an exploratory question.

2. Did recovery rate in anger and sadness within each emotion-eliciting context cohere? If the coherence for recovery rate measures paralleled the coherence for measures of reactivity in anger and sadness during the episode in all three episodes, such coherence would suggest recovery rate worked very much like another parameter of emotional reactivity in episodes designed to elicit both emotional reactions.

3. Did recovery rates in anger and sadness cohere across episodes? Support for coherence would indicate cross-situational consistency for this parameter of emotional response, indicating that it had trait-like properties.

4. Did the context-specific and cross-context composite recovery rate scores for anger and sadness correlate with validity measures? The hypotheses listed below and related inferences were hierarchical such that the inferences associated with support for hypothesis 4_C also assumed support for hypotheses for 4_A and 4_B.

4_A. If recovery rate scores predicted teacher ratings of ERC subscales, I would have evidence that recovery rate scores can be used as an observer-based index of emotion regulation.

4_B. If recovery rate scores predicted maternal ratings of HBQ internalizing and externalizing, I would have supportive evidence that this behavioral index serves a broader regulatory function than just emotion regulation similar to physiological indices such as the RSA.

4_C. If recovery rate scores predicted effortful control I would have direct evidence for Rothbart's assumption that effortful control predicts direct behavioral indices of emotion regulation.

CHAPTER II

METHOD

Participants

The current study was the second wave of assessments from an ongoing longitudinal project in socio-emotional development laboratory at Koç University, Istanbul, Turkey. The sample consisted of 67 mother-child dyads. Children ranged between 3.61 and 7.01 years of age (M = 5.33, SD = .96). There were 29 girls (43.3%) and 38 boys (56.7%), and 46 attended preschools and 15 were in the first grade. The mean age of mothers and fathers were 37.39 (SD = 3.57) and 40.67 (SD = 4.38), respectively. The mean years of education for both mothers and father were 15.4. Ten percent of mothers had high school degree or less, 10.5 % had some college degree, 46.3 % had a college degree, and 29.9 % had a graduate degree. Most of the children were from intact families (82.1%). Seventy percent of the mothers were half-time or full-time employed, whereas 98.4 % of the fathers were half-time or full-time employed. Mothers rated their family income on a six point scale and average monthly family income of families were 7500 TL (4746 USD). 10.6 % had monthly family income between 1000-3000 TL (632-1898 USD), 19.7% had between 3001 and 5000 TL (1898-3164 USD), 10.6 % had between 5001 and 7000 TL (3164-4430 USD), 19.7 % has between 7001 and 10.000 TL (4430-6329 USD), and 39.4 % had more than 10000 TL (6329 USD).

Overview of the Procedure

Mothers and their children participated in a laboratory session at Socio-Emotional Development Laboratory at Koç University. The sessions lasted $2^{1/2}$ to 3 hours and were conducted by one of two female experimenters (E). The assessments took place in a naturalistically furnished living room and all procedures were videotaped from behind a one-

way mirror for later coding. Some assessments targeted mother-child relationship and others targeted child's socio-emotional competencies and emotional reactivity.

Children's effortful control and emotion regulation were observed during standard behavioral batteries. Effortful Control was assessed in six-game like tasks and children did not receive corrective feedback during the actual trials. At the beginning of the session, mothers were asked to stay neutral and work on their questionnaires while E interacted with the child. Children's emotion regulation was assessed in four different tasks. In the Disappointing Gift Paradigm, children's ability to adhere to the prevailing display rule was observed. In addition, children's recovery from anger and sadness were observed during three tasks designed to elicit distress, Impossibly Perfect Circles, End of the Line and Yarn (a modification of the Transparent Box episode). Mothers completed a set of questionnaire in which they evaluated behavioral problems of their children. In addition, teachers completed emotion regulation checklist.

Measures

Anger and Sadness: Reactivity and Recovery

Children's reactivity in anger and sadness and their recovery during the debriefing phase were observed in three tasks drawn from the Laboratory Temperament Assessment Battery (PS-LAB-TAB; Goldsmith, Reilly, Lemery, Longlet, & Prescott, 1995).

Procedure. *End of the Line (EL)* task was designed to elicit frustration in an interpersonal setting. E presented the child with an interesting and novel toy and permitted the child to play with it for 30 seconds. As soon as the child engaged with the toy, the E changed her mind and removed the toy saying, "I don't want you to play with it anymore". E answered child's protests in the ensuing 30 seconds with the following response: "Because that is the way it is". At the end of the 30 seconds, E apologized for being mean and suggested that she

was afraid the child was going to break this really special toy but should have indicated that more appropriately.

Impossibly Perfect Circles (PC) task was designed to elicit frustration in an interpersonal setting. In this episode, E asked the child to draw a perfect circle over and over again for 2 minutes. E criticized each circle in a neutral tone of voice such as "this is too flat" or "this is too big". At the end of the episode, child was praised for the success of his best circle while the E acknowledged the difficulty of the task.

Yarn (YR) is a modification of transparent box task of preschool LAB-TAB (Goldsmith et al., 1994). The child was given a clew of red, yellow, and green colored strings of yarn. Child was asked to untie the clew and group the yarns according to their colors in a 2 minute-period, an impossible task for the time allotted. At the end of the episode, E thanked the child for helping her and explained that she would continue to untie later on.

Coding and Reliability. Coders noted emotional responses in all three contexts in three separate phases: baseline, active elicitation, and recovery/debriefing. Baseline period began 15 seconds before the active elicitation and recovery period began as soon as E delivered the standardized prompt marking the beginning of debriefing and lasted at most 60 seconds.

In all three phases, coders noted the presence/absence of children's anger and sadness from all modalities (facial, bodily, verbal) in 5-second epochs. In addition, the coders noted the peak intensity of anger and sadness once for the baseline period (15 seconds), evaluated peak intensity in 30-second epochs during the active elicitation phase, and noted both peak intensity and lowest level of intensity during debriefing with a 4 point Likert scale (0 = absent, 3 = high intensity). Finally, coders noted latency to first expression of anger and sadness during the active elicitation phase (those who did not show anger/sadness were

assigned 121) and latency to lowest level anger and sadness during the debriefing phase (those who did not return to baseline were assigned 61). In addition, during debriefing phase, presence/absence of smiling was noted in 5-second epochs, peak intensity of smiling (0= no smile to 3 = large smile), and latencies to first and highest intensity smile were noted. The Kappa's for binary and intensity scales ranged from .73 to 1.00 and ICCs for latencies ranged from .81 to 1.00, indicating adequate inter-rater reliability (See Appendix A for EL, Appendix B for PC, and Appendix C for YR for coding scheme layout).

Data Reduction. Frequency of target emotion was transformed to relative frequency scores by dividing the frequency of each emotion by total number of segments, describing duration of anger and sadness separately during baseline, active elicitation and recovery phases in each of three contexts. In order to form composites describing overall reactivity in sadness and anger during active elicitation, latency to first sadness and anger expression were first reversed. All duration, intensity, and latency scores were z-transformed. Because all three parameters were at least moderately intercorrelated, the corresponding z-scores were averaged. In addition, in order to make mean comparisons across contexts, raw scores were computed for sadness and anger in all three contexts. The formation of those latter set of composites were discussed in the result section. Table 1 gives the Cronbach's alpha for the composites in all three contexts.

Measures to describe reactivity in anger/sadness during the baseline phase were not computed because the variability was low. One child showed anger in the baseline phase of EL, while in the baseline phase of YR, 3 children showed sadness and 9 children showed anger. Children did not show sadness or anger in PC.

Because of the novelty of trying to characterize emotional responses during recovery from an emotionally challenging situation, two sets of recovery composites were created. The

Table 1. *Descriptive statistics of z-score composites for sadness and anger in active elicitation phase of all three episodes.*

		Mean	SD	Range	α
PC					
	Sadness	-.01	.76	-.84-1.59	.82
	Anger	.02	.65	-1.72-1.86	.71
YR					
	Sadness	.01	.77	-.82-1.63	.85
	Anger	.00	.76	-2.03-1.42	.87
EL					
	Sadness	.00	.93	-.99-1.68	.82
	Anger	.00	.86	-2.13-1.04	.93

first set of recovery composites characterized the magnitude of the diminishing negative affect separately for anger and sadness and the magnitude of the increasing positive affective responses. The second set of recovery composites was more empirically driven in nature. The patterns of intercorrelations among the emotional response parameters during each of three episodes were examined and parameters of emotional response whether positive or negative that cohered in each episode and replicated in all three episodes were pooled into a composite. Both sets of composites were described below.

In characterizing the magnitude of diminishing anger and sadness responses during the recovery phase, duration and peak intensity parameters were not used. Unlike the baseline and active elicitation phases, the onset and end of the debriefing statements delivered by the E was more difficult to demarcate and varied from episode to episode. In other words, it was difficult to specify when one would expect a diminishing in negative affective responses to begin. For example, often debriefing statements began with: ‘hmmm, you know what?’ pause ‘I don’t think this was fair,’ pause, ‘no one can draw perfect circles like computers, right?’ pause, ‘you worked so hard and did a really good job with these circles though, hmm, take a

look at this circle, I think this is almost a perfect circle, I really like this circle, thank you for working so hard and doing such a good job.' In contrast, during the EL episode debriefing statements were shorter: 'hmmm, you know what? I am sorry for being so rude there. I thought you were going to break the toy, and that's why I took it away. I didn't mean to be rude I am sorry. If you promise to be careful we can play together, do you want to play with this toy?' This variability in debriefing statements from episode to episode influenced most strongly the duration and peak intensity of anger and sadness parameters during the entirety of recovery phase (from end of active elicitation to end of the episode). Specifically, duration of anger and sadness variables appeared to be a better measure of reactivity during the psychological transitions within debriefing phase, while peak intensity of anger and sadness variables appeared to be a better measure of active elicitation.

In contrast, latency to lowest level intensity of anger and sadness, and intensity of the lowest level anger and sadness reached at the end of the episode, about 10-15 seconds after the debriefing statements were delivered, reflected more accurately the magnitude of the diminishing reactivity in anger and sadness responses. Hence, the recovery composites for sadness and anger included only the lowest level of intensity for the target emotion and latency to lowest level intensity of the target emotion. The inferences involving external variables were not altered as a result of the choice to omit duration and peak intensity parameters from the recovery phase. In other words, lowest level intensity in sadness and anger, and latency to lowest level intensity measures were z-transformed and averaged to form the recovery phase composites for anger and sadness and each composite was reversed so that high scores represented faster and more complete recovery while low scores represented slower and/or incomplete recovery to baseline.

Finally, magnitude of the increasing positive affective responses during recovery were captured using duration of smiling, latency to first smile, peak intensity of smiling and latency

to peak intensity smiling parameters, which were z-transformed and averaged. Table 2 gives the Cronbach's alpha for the emotion specific recovery composites in all three contexts. In order to compare contextual differences in recovery rates across the episodes, raw recovery composites scores were also computed but their formation was discussed in the results section.

Table 2. *Descriptive statistics of z-score composites of emotion specific recovery composites in the debriefing phase of the episodes.*

		Mean	SD	Range	α
PC					
	Sadness	.00	.85	-2.96-.64	.62
	Anger	.00	.84	-5.02-.78	.57
	Smiling	.00	.92	-1.15-2.19	.94
YR					
	Sadness	.00	.89	-2.88-.66	.74
	Anger	.00	.80	-4.17-.64	.42
	Smiling	.00	.91	-.94-1.66	.93
EL					
	Sadness	.00	.87	-2.85-.78	.70
	Anger	.00	.81	-5.10-.46	.46
	Smiling	.00	.89	-1.13-2.00	.91

As mentioned earlier, in addition to emotion specific recovery measures, an empirically driven approach to characterizing emotional responses during the recovery phase was also adopted. The parameters of emotional responses in anger, sadness, and smiling were examined for coherence in each of three contexts and a search for those patterns that replicated across all three contexts was executed. This simple search indicated that latency to first smile and latency to lowest level sadness intensity were significantly and positively correlated in each of three contexts, $r(65) = .31$, $p < .05$ for PC, $r(62) = .21$, $p < .10$ for YR, and $r(64) = .73$, $p < .001$ for EL. Those correlations indicated that children who smiled early

in recovery phase tended to recover more quickly in sadness as well. Those two parameters were z-transformed and averaged to form a cross-emotion recovery composite in each of three episodes. Table 3 gives the Cronbach's alpha for the cross-emotion recovery composites in all three contexts. Presence of two sets of composites enables us to examine differences in the relative meaningfulness and validity of various perspectives to quantify emotional responses during recovery in relation to external variables.

Table 3. *Descriptive statistics of z-score composites of cross-emotion recovery composites in the debriefing phase of the episodes.*

	Mean	SD	Range	α
PC	.00	.81	-1.65-1.27	.47
YR	.00	.78	-1.42-1.11	.35
EL	.00	.93	-1.49-1.39	.84

External Validity Measures

External validity measures included both observational measures and questionnaires. Children's display rule adherence during the disappointing gift paradigm and effortful control were measured with observational measures. Questionnaire measures included maternal ratings of symptoms and teacher ratings of emotion regulation.

Observational Measures: Disappointing Gift

Procedure. Children's adherence to display rule was examined in the Disappointing Gift paradigm of Cole (1986). In the middle of the session, the child was shown four toys and asked to rank-order the toys from the least liked to the most liked. In this task, child's least liked toy was presented in a wrapped box at the end of the session and child was left alone to open the box. 30 seconds after the child opened and saw the content of the box; E entered the room and asked the following question: "Do you like your present?" Child's reactions were

observed for another 30 seconds. During the debriefing phase, E indicated that she wrapped the wrong gift by mistake and gave the child's original choice.

Coding and Reliability. The coding was completed in two phases. In the first phase, the child's reactions to the disappointing gift were observed while alone in the room and in the second phase the child's reactions to the gift were observed in the presence of the E. In both phases, the coders noted the presence/absence of smiling, sadness, anger, protest, positive and negative comments in 5 second-epochs. And in both phases, the coders noted the peak intensity of smiling (0 = absent, 3 = high intensity). Finally, latencies to first smile, sadness, anger, protest, positive and negative comments were noted (see also Appendix D for Disappointing Gift). The kappa for binary and intensity scales ranged from .63 to .93 and ICCs for the latencies ranged from .92 to .99.

Data Reduction. In each of two phases, frequency of smiling, sadness, anger, protest, positive, and negative comments were transformed to relative frequency scores. In order to capture the contextual appropriateness of displayed emotional reactions, duration of smiling and positive comments about the gift when the child was alone was subtracted from the same corresponding durations when the child was with E. A positive difference score reflected greater adherence to the display rule in the presence of E than when alone. The subtraction was reversed for affectively negative reactions so that the positive difference scores reflected contextually appropriate emotional displays. Specifically, durations of sadness, anger, protest, and negative commentary about the gift when the child was with E was subtracted from the same corresponding durations when the child was alone.

In order to form an overall composite that expressed extent of adherence to display rule, reversed latencies, differenced relative frequency scores describing contextual appropriateness of emotion display durations, and smiling intensity were all z-transformed. In

the first step, a composite describing overall positivity and overall negativity were formed. Overall positivity included reversed latency and differenced relative frequency for smiling and positive comments, and smiling intensity in the presence of E, alpha = .84. Overall negativity included average of reversed latency to sadness, anger, protest, and negative comments and excluded differenced relative frequency for the corresponding reactions as the latter were not correlated, alpha = .71. The correlation between the overall negativity and positivity scores was significant, r (65) = -.62, $p < .001$. An overall display rule composite was formed by averaging overall positivity and reversed overall negativity scores, Cronbach's alpha .75.

Observational Measures: Effortful Control

Effortful Control was assessed by six game-like tasks (Walk-a-line Slowly, Telephone Polls, Gift, Snow-Grass, Bear-Dragon, and Tapping) which tapped slowing down motor activity, delaying, and suppressing/initiating activity to signal (Kochanska et al., 1996).

Procedure. Ability to slow down fine and gross motor responses were assessed with Walk-a-line slowly and Bridge task (an adaptation of the Telephone polls tasks). Walk-a-line slowly assesses children's ability to walk on a line as slowly as possible (2 trials). Bridge assesses children's ability to draw a straight bridge on paper for one slow (turtle) and one fast trial (rabbit) to help them get to their food across a river. Ability to delay was assessed with the Wrapped gift task. In this task, children's ability to sit in a chair facing away from the experimenter while the experimenter was wrapping the gift in a noisy way (2 minutes) in the first phase and asking the child wait seated for a bow before touching the gift in the second bow phase (one minute) was assessed. Children's ability to suppress a dominant response in order to perform a subdominant response was assessed with Snow-grass, Bear-dragon, and Tapping tasks. Snow-grass required children to show the snow card for "grass" and show the grass card for the "snow" prompt (12 trials). During the Bear-dragon task, children were

asked to execute the commands of a friendly bear puppet (e.g. touch your nose) and inhibit responding when the dragon puppet issued commands (12 trials). Tapping task involved two phases with 12 trials each. In the first phase, children were asked to tap their pencil once when E tapped twice, and tap twice when E tapped once. In the second phase, children were asked to tap once when E tapped twice, asked to tap twice when E tapped once, and to inhibit tapping when E tapped three times (12 trials).

Coding and reliability. For slowing down motor ability, the errors and the duration of each trial were coded in Walk-a-line and Bridge. For Gift task, coding involved latency to fidgeting, peek score (1= turns around to peek, 5 = doesn't peek), and latency to each peek score during the gift wrapping phase, while the coding involved latency to fidgeting, latency to leave seat, touch score (1 = opens gift, 4 = doesn't touch), and latency to each touch score during the waiting for the bow phase. For suppressing/initiating ability, a scale from 0 to 3 (0 = fails to point, 1 = incorrect response, 2 = self-correction and, 3 = correct response) was used in the Snow-grass and two phases of the Tapping task. In Bear-dragon task, the activation of proper response for bear were coded on a 4-point scale (0 = doesn't activate/inhibit behavior, 3 = fully activate/inhibit behavior) and inhibition of the behavior for dragon were coded on a 4-point scale (0 = fully activate/inhibit behavior, 3 = doesn't activate/inhibit behavior) (See Appendix E for the detailed coding). The Kappa for categorical scales ranged from .79 to 1.00 and intraclass correlations (ICC) for latency and duration scores ranged from .98 to .1.00

Data Reduction. In Walk-a-line, the mean of two slow walk trials were computed. In Bridge, turtle trials score was subtracted from rabbit trial score. The two scores were correlated, r (66) = .51, $p < .001$ and were standardized and averaged to form a slowing down composite. In the wrapping phase of the Gift task, the mean of latency to fidgeting and latency to peek score 2, 3, and 4 were computed. In the waiting for the bow phase of the Gift task, latency to leave seat, touch score, and latency to touch score 1, 2 and 3 were averaged.

The two scores were correlated, r (65) = .39, p < .001, and were standardized and averaged to form a delaying composite. In Snow-grass task, trial scores were first summed, the number of trials in which the child failed to respond at all (code 0) was subtracted from the sum. Same procedure was applied to the two phases of Tapping task and the Dragon trials. The correlations from the latter set of three tasks ranged between .29 and .65. For an overall suppressing/initiating composite, the average of these three tasks was taken. Finally, an overall Effortful Control composite score was generated from the average of standardized scores of six tasks. The Cronbach's alpha for the composite was .70.

Questionnaires: Behavioral Problems

Mothers completed the MacArthur Health and Behavior Questionnaire-Parent Version (HBQ-P). HBQ-P was developed by Essex and colleagues (2002) and is a part of larger battery of assessments including children's functioning in four domains: emotional and behavioral symptoms, physical health, social adaptation, and school adaptation. In the current study only the 84 items pertaining to behavioral symptom scales were administered. The items are evaluated on a 3-point Likert type scale (1 = never or not true for the child, 2 = somewhat or sometimes true, 3 = very often or often true). Previous studies have shown the questionnaire to have high test-retest reliability and can be used to differentiate high and low symptom groups in a large US sample (Essex et al., 2002). The questionnaire taps symptoms of depression, overanxiousness, separation anxiety, social inhibition, asocialness with peers in the internalizing spectrum, and oppositional defiance, conduct disorder, overt hostility, relational aggression, inattention, and impulsivity scales in the externalizing spectrum. The questionnaire was translated to Turkish by Nazan Aksan and Feyza Çorapçı. In the current study, the Cronbach's alphas for internalizing problems and externalizing problems were .73 and .78, respectively (See Appendix F).

Questionnaires: Emotion Regulation

Mothers asked preschool and first grade teachers to complete Emotion Regulation Checklist (ERC, Shields and Cicchietti, 1997) and return it to the laboratory in prepaid envelopes. The checklist consists of 24 items, evaluated on a 4-point Likert type scale (1 = never, 2 = sometimes, 3 = often, 4 = always). ERC consists of two subscales, Lability/Negativity and Emotion Regulation. The lability/negativity subscale is comprised of items related to emotion dysregulation such as lack of flexibility, mood lability, and dysregulated negative affect. Sample items are "Is prone to angry outbursts" and "Exhibits wide mood swings". The emotion regulation subscale consists of items related to adaptive regulation such as appropriate emotional expressions, empathy, and emotional awareness. Sample item of this subscale is "Is empathic toward others" (See Appendix G). In the current study, the Cronbach's alphas for emotion regulation and lability were .68 and .82, respectively (See Appendix G).

CHAPTER III

RESULTS

The results of the current study are organized in two parts. In the first part, exploratory analyses with regard to age and sex differences, and contextual differences in active elicitation and recovery phases are described. In the second part, individual difference analyses are presented examining the nature of recovery phase and the relation of recovery composites to external variables.

Exploratory Analyses: Age and Sex Differences

The examination of correlations between active elicitation and recovery phase composites and child's age and mean differences given child sex revealed generally null findings. There were a total of 15 correlations with age, (range: -.14 to .32), but only the correlation between smiling in EL was correlated with age at .05 level, not exceeding chance levels. Thus, there was not a significant relation between age and reactivity and recovery composites. In addition, 15 independent sample t-tests were conducted to examine sex differences in each context of each composite. Girls and boys did not differ significantly from each other in the analyses. Given those generally null findings, in individual difference analyses speaking to cross-contextual coherence in reactivity and recovery measures on a task-specific basis neither age nor sex was partialled out.

Contextual Differences in Active Elicitation and Recovery Phase

In exploratory analyses, mean-level differences in emotional responses during the active elicitation and recovery phases across the three contexts were examined.

Raw composite formation

In order to examine mean-level differences in emotional responses across the three contexts, raw composite scores were computed. These scores were identical in item content to those presented in the Methods section using z-score transforms of the response parameters for each emotion. Recall that composites in the active elicitation included all three response parameters (latency to first expression, peak intensity and duration), and composites for anger and sadness in the recovery phase included two response parameters (latency to lowest intensity level and lowest intensity level) while composite for positive affect in the recovery phase included four response parameters (latency to first smile, latency to highest intensity smile, duration of smiling and peak intensity of smiling).

In order to form a composite that would be sensitive to mean differences across contexts, each response parameter was divided by appropriate constants to rescale the original variable to range from 0 to 1. For example, raw peak intensity measures ranging from 0 to 3 were divided by 3, and latency measures were divided by 121 for PC and YR, and 31 for EL episodes during the active elicitation phase and all latency measures during the recovery phase were divided by 61. The resulting rescaled variables for each response parameter were summed with duration measures, which were relative frequency scores and already ranged from 0 to 1, for sadness and anger during active elicitation. Hence, raw composite scores for anger and sadness could range from a minimum of 0 to a maximum of 3 during active elicitation in all three contexts.

A parallel procedure was adopted to form raw composite scores for anger, sadness and smiling during the recovery phase. Because only two response parameters were included in the anger and sadness composites, those scores ranged from 0 and 2. However, because there were four response parameters in the smiling composite, that composite ranged from 0 to 4.

Table 4 gives the descriptive statistics for active elicitation and emotion specific recovery composites.

Mean differences across contexts during active elicitation and recovery phases

In order to examine the effects of tasks on emotion, five one-way within subject ANOVAs were run. Tasks served as the repeated measures factor with three levels (YR, PC, and EL). The results revealed an overall effect of tasks on sadness reactivity (F (2, 124) = 51.56, $p < .001$) and anger reactivity (F (2, 124) = 14.76, $p < .001$) in active elicitation phase. In order to investigate, specific effects, two contrasts were run to understand the significant main effect of task on sadness and anger reactivity. In the first contrast, the mean difference between inter- (PC and EL) and intra-personal task (YR) was examined. In the second contrast, the difference between the two interpersonal tasks was examined.

The findings showed that children displayed higher levels of sadness during the active elicitation phase in interpersonal tasks (PC and EL) than the YR task (F (1, 62) = 32.34, $p < .001$). In addition, children showed higher levels of sadness in the EL than the PC task (F (1, 62) = 69.54, $p < .001$). The findings also indicated that children displayed higher levels of anger during the active elicitation phase of the YR task than the interpersonal tasks (PC and EL) (F (1, 62) = 11.27, $p < .001$). In addition, children showed higher levels of anger in the PC than the EL task (F (1, 62) = 17.03, $p < .001$).

Individual Difference Analyses

Individual difference analyses examined the following patterns: a) extent of cross-contextual coherence in emotional reactivity measures during active elicitation in all three episodes, b) extent of the cross-contextual coherence in emotional reactivity measures during

Table 4. *Mean differences across contexts in emotional responses during active elicitation and recovery phases.*

	YR [a]		PC [b]		EL [c]		F for overall model	
	M	SD	M	SD	M	SD		
Active Elicitation								
Sadness	.78	.64	.86	.78	1.99	.82	51.56*	(PC, EL) > YR; EL >PC
Anger	1.78	.61	1.74	.57	1.13	1.01	14.76*	YR > (PC, EL); PC > EL
Emotion Specific Recovery								
Sadness	1.63	.47	1.64	.37	1.53	.44	1.22	-
Anger	1.67	.33	1.62	.34	1.75	.37	2.02	-
Smiling	1.45	1.34	1.47	1.10	1.50	1.12	.03	-

* $p < .001$

Note: N for a, b, and c = 63 in active elicitation, N for a, b, and c = 59 in emotion-specific recovery.

recovery phases, c) the relations of emotional reactivity measures between the active elicitation and recovery phases; d) the differential association of reactivity measures during active elicitation and recovery phases with external validity measures.

Cross-contextual coherence during active elicitation and recovery phases

Table 5 presents the correlations among anger and sadness composites during the active elicitation phase within and across tasks. Only 2 out of 15 correlations were significant at the .05 level, not exceeding chance levels. Lack of coherence for sadness and anger measures across contexts indicated a large degree of cross-contextual variability in anger and sadness responses. Observed reactivity measures in these three contexts did not appear to tap coherent measures of trait-level proneness to anger or sadness.

Table 5. *Correlations among active elicitation phase composites.*

	Sadness			Anger		
	PC	YR	EL	PC	YR	EL
Sadness						
PC	1					
YR	.00	1				
EL	.08	-.06	1			
Anger						
PC	.08	-.10	-.05	1		
YR	-.05	.47**	.03	.02	1	
EL	.10	-.06	-.31*	-.01	.04	1

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

Table 6 presents the correlations speaking to coherence among emotional responses (anger, sadness and smiling) during the recovery phase within and across the three contexts. Nine out of 36 correlations were significant at the .05 level, exceeding chance levels. Coherence in emotional recovery measures were evaluated in three ways: 1) extent of coherence among recovery measures within each of three tasks; 2) cross-contextual coherence

of emotion-specific recovery measures (anger, sadness and smiling); 3) cross-contextual coherence among different emotional recovery measures, e.g. sadness versus smiling, sadness versus anger.

Table 6. *Correlations among recovery phase composites.*

	Sadness			Anger			Smiling		
	PC	YR	EL	PC	YR	EL	PC	YR	EL
Sadness									
PC	1								
YR	-.04	1							
EL	.22^{+}	-.04	1						
Anger									
PC	.10	-.13	-.04	1					
YR	-.21	.16	-.12	-.13	1				
EL	.05	-.05	.50**	.08	-.05	1			
Smiling									
PC	**.32***	**.20**	**.18**	.16	-.10	.22^{+}	1		
YR	**.26***	**.28***	**.14**	-.05	.01	.28*	.38**	1	
EL	**.32***	**-.22**$^{+}$	**.62****	.22^{+}	-.16	.38**	.43**	.08	1

$^{+}p < .10$, $*p < .05$, $**p < .001$

Note: N ranges from 60 to 65.

First, convergence or coherence among all three recovery measures within each task was examined. Only in the EL task, all three recovery measures were significantly correlated with each other, revealing that diminishing sadness and anger, and increasing positive affectivity went hand in hand. In the PC and YR tasks, diminishing sadness went hand in hand with increasing positive affect only, and diminishing anger was not related to either diminishing sadness or increasing positive affectivity.

Extent of cross-contextual coherence among emotion specific recovery measures was examined next. For example, if sadness recovery measures converge across the three tasks,

such a pattern would indicate consistency in relative rank-order as it was expected from a trait-like construct. The results showed that only increasing positive affect, smiling measures, evidenced a trait-like pattern, with two out of three correlations being significant at the .001 level. Children who smiled quickly and intensely in the PC task tended to do the same in the YR and EL tasks as well. However, the pattern of correlations did not support a coherent trait-like pattern for recovery measures in anger or sadness. For example, there was only one significant correlation at the .10 level for sadness recovery, and none of the correlations were significant for anger recovery across the three tasks. The lack of cross-contextual coherence for sadness and anger recovery indicated that there was variability in rank-order in children's recovery from sadness and anger across the three tasks.

Finally, extent of cross-contextual coherence in different emotional recovery measures was examined. The pattern of correlations indicated that recovery from sadness and smiling measures cohered in all three tasks. Those correlations suggested that diminishing sadness and increasing positive affect during debriefing phase went hand in hand not only within tasks but also across tasks, 5 out of 9 correlations were significantly positive. This pattern indicated that a trait-like recovery from emotionally challenging situations may be best represented as a combination of recovery from sadness and increase in positive affect.

Coherence among reactivity measures in the active elicitation and recovery phases

Intercorrelations among emotional responses during active elicitation and recovery phases are presented in Table 7. Those correlations inform whether rank-order in recovery is related to rising reactivity within contexts. For example, children who are high in reactivity during the active elicitation may be low in recovery in each context. Such a pattern may indicate that rising reactivity and diminishing reactivity or recovery are emotional response parameters that together form an emotional profile or affective style in specific contexts. The bolded correlations in Table 7 would speak to such a pattern.

Table 7. *Correlations among active elicitation and emotion specific and cross-emotion recovery composites.*

	Emotion Specific Recovery									Cross-Emotion Recovery		
	Sadness			Anger			Smiling					
Active Phase Sadness	PC	YR	EL	PC	YR	EL	PC	YR	EL	PC	YR	EL
PC	**-.21**$^{+}$	-.35**	.00	.06	-.06	.13	-.23^{+}	-.14	-.02	**-.29***	-.34**	-.04
YR	.13	**-.21**	.24^{+}	.27*	.00	.16	-.13	-.16	.22^{+}	-.01	**-.21**$^{+}$	.30*
EL	-.10	.02	**-.25***	-.06	.11	-.20	-.16	-.12	-.30*	-.26*	-.10	**-.30***
Anger												
PC	-.02	-.18	.10	-.22^{+}	-.02	.01	.03	-.06	.09	-.09	-.14	.03
YR	.19	-.23^{+}	.17	.26*	-.12	.32*	.10	-.07	.11	.17	-.22^{+}	.16
EL	-.05	-.23^{+}	-.20	.30*	-.05	.04	.03	.01	.15	.03	-.12	-.01

$^{+}p < .10$, $*p < .05$, $**p < .001$

As can be seen from Table 7, correlations were almost supportive of such a coherent overall response pattern for sadness. Sadness in active phase of the PC and EL task was negatively associated with recovery from sadness in corresponding tasks, but this pattern was not strong enough to give rise to statistically significant correlations in YR, given low N. However, when all sadness measures during active elicitation and all recovery from sadness measures were considered together, the pattern of correlations suggested that higher reactivity in sadness during active elicitation was associated with greater difficulty in recovering from sadness.

The correlations for anger, on the other hand, were not supportive of such a response pattern. Only anger in active phase of PC was negatively related to recovery from anger in PC, but this pattern was not significant for other two tasks. The pattern of correlations for anger indicated that rank-order in recovery was not related to reactivity in anger within tasks.

A parallel pattern was observed when coherence between reactivity measures during active elicitation and cross-emotion recovery measures were examined. Reactivity in sadness during active elicitation was negatively associated with cross-emotion recovery in all three episodes, supporting a coherent response profile within each context that was also observed in all three contexts. Children who showed a lot of sadness during the active elicitation phase had difficulty recovering when the latter captured both diminishing sadness and increasing positive affect. A similar pattern was not observed for reactivity in anger during active elicitation and cross-emotion recovery measures. There was only one correlation significant at the .10 level.

Formation of cross-episode composites

Despite lack of coherence consistent with a trait view in anger and sadness during the active phase, a composite score that averages scores from all three contexts will describe and reflect relative rank-order across in anger and sadness reactivity in multiple contexts. The episode specific measures of anger and sadness during the active elicitation phase were standardized and averaged to form an Overall Sadness and Overall Anger measure. Similarly, average recovery composite scores were formed to capture rank-order across three tasks to reflect Overall Recovery in Sadness, Overall Recovery in Anger, Overall Smiling during recovery and Overall Cross-emotion recovery. Descriptive statistics for those overall composites, intercorrelations with each other and child's age are presented in Table 8.

As can be seen from Table 8, Overall Sadness reactivity during the active elicitation phase was negatively associated with overall recovery from sadness and increasing smiling during the debriefing phase. Those correlations suggested that quick and more intense sadness reactions during emotional challenging situations tended to go with slower and less complete recovery from sadness and slower increase in positive affect when the challenge was removed. In addition, the correlations among the recovery phase composites indicated that

overall smiling was positively associated with both overall recovery from sadness and overall recovery from anger. In other words, increases in positive affect went hand in hand with diminishing anger and sadness responses during debriefing phase.

Table 8. *Descriptive statistics and intercorrelations of cross-contextual composites.*

	1	2	3	4	5	6	7
			Intercorrelations				
Active Elicitation Phase							
1.Sadness	1						
2.Anger	.04	1					
Recovery Phase							
3.Sadness	-.22^{+}	-.08	1				
4.Anger	.17	.17	.07	1			
5.Smiling	-.28*	.11	.56**	.23^{+}	1		
6.Cross-emotion	-.34**	.03	.84**	.11	.85**	1	
7.Age	-.06	-.01	.30*	.08	.28*	.32**	1
			Descriptives				
Mean	.01	.00	-.01	.00	-.01	-.01	-
SD	.61	.59	.65	.56	.74	.73	-
Range	-1.08-1.92	-1.47-1.19	-2.14-.82	-1.93-.70	-1.19-2.16	-1.93-1.48	-

$^{+}p < .10$, $*p < .05$

Finally, Table 8 shows that children's age was correlated with three out of four overall recovery measures. Older children recovered more quickly and completely from sadness and showed greater positive affect.

Interrelations of Reactivity and Recovery Measures with External Validity Measures

The external validity measures included disappointing gift, effortful control, maternal ratings of externalizing and internalizing symptoms, and teacher ratings of emotion regulation and lability. The descriptive statistics, the intercorrelations among these measures and their correlations with age are presented in Table 9.

Table 9. *Descriptive statistics and intercorrelations of external variables.*

	1[a]	2[b]	3[b]	4[b]	5[c]	6[c]	7
			Intercorrelations				
1. Disappointing Gift	1						
2. Effortful Control	.21^{+}	1					
3. Internalizing Problems	.14	-.13	1				
4. Externalizing Problems	-.16	-.31*	.62**	1			
5. Emotion Regulation	.00	-.01	-.27^{+}	-.17	1		
6. Lability/ Negativity	-.43**	-.18	.08	.35*	-.17	1	
7. Age	-.07	.54**	-.22^{+}	-.27*	-.11	-.05	1
			Descriptives				
Mean	.00	.00	14.18	20.25	3.31	1.68	-
SD	.89	.57	7.88	10.09	.45	.41	-
Range	-1.72-1.36	-1.72-1.24	1.00-37.00	2.00-46.00	2.43-4.00	1.07-2.87	-

$^{+}p < .10$, $*p < .05$, $**p < .001$

Note: [a]N range 42 to 65, [b]N range 43 to 67, [c]N = 43.

Maternal reports of internalizing and externalizing problems were correlated with teacher report of emotion regulation and lability/negativity, respectively. Children with internalizing problems had lower scores in emotion regulation, indicating that they had problems in adaptive emotional regulation. Children with externalizing problems, on the other hand, had higher scores in lability/negativity, pointing out that those children had higher score in emotion dysregulation like lack of flexibility, mood instability. In addition, correlations with child's age were in the expected direction. Older children scored higher in effortful control and lower in both internalizing and externalizing symptoms.

Effortful control was positively associated with children's adherence to display rule and negatively related to externalizing behavior problems. In other words, children who were temperamentally well regulated were successful at display rule use in Disappointing Gift Paradigm and were also rated as having lower levels of externalizing problems by their mothers. Finally those children who were successful at showing appropriate emotional response in the Disappointing Gift Paradigm were also rated as having lower scores in lability/negativity by their teachers, indicating that problems in adherence to display rule was associated with emotion dysregulation.

The correlations between the overall reactivity measures during the active elicitation phase, overall recovery measures during the debriefing phase were examined in relation to external variables in Table 10. Because effortful control, internalizing and externalizing scores were correlated with age, those measures were residualized for age and correlations were examined both for residualized and non-residualized scores.

First, the correlations without residualizing age were examined. Six out of 36 correlations were significant at the .10 levels, exceeding chance levels. Those children who were good at adherence to display rule tended to showed lower levels of sadness during the active elicitation phase of emotionally challenging situations.

If effortful control does serve an emotion regulatory function, it was expected to correlate significantly with better recovery following emotionally challenging situations and it was expected to correlate with adherence to display rule measures from the Disappointing Gift paradigm. Overall recovery in sadness, smiling during the debriefing phase, and overall cross-emotion recovery measures were positively associated with effortful control. Adherence to display rule in the Disappointing Gift paradigm was correlated with both effortful control (shown in Table 9) and smiling during the debriefing phase (shown in Table 10). Although

overall recovery from anger was unrelated to effortful control, it was positively correlated with teacher reports of emotion regulation. None of the recovery measures were significantly associated with maternal ratings of symptoms.

However, the meaningful links between Effortful Control and recovery measures were weakened when age was residualized from effortful control and given the low N, the residualized correlations were no longer significant.

General Summary of the Findings

The findings were examined in two parts. In the first part, exploratory analyses revealed the following: a) Task specific composites during active elicitation and recovery phases were not correlated with age and there were no gender differences in those measures; b) Children displayed higher levels of sadness when they were with E (in the PC and EL tasks) compared to when they were alone (the YR task), and c) Children showed higher levels of anger when they were alone (the YR task) than when they were with E (in the PC and EL tasks).

In the second part, individual analyses were conducted to examine the extent of coherence among reactivity and recovery measures and the relations of those measures to external validity measures were examined. The results showed the following: a) Neither

Table 10. *Correlations among active elicitation phase composites, cross-emotion recovery and external variables.*

	Observational			Mother Report				Teacher Report	
	Disappointing Gift [a]	Effortful Control [b]	Effortful Control with age controlled	Internalizing Problems [b]	Internalizing Problems with age controlled	Externalizing Problems [b]	Externalizing Problems with age controlled	Emotion Regulation [c]	Lability/ Negativity [c]
				Active Elicitation					
Overall Sadness	-.26*	-.19	-.19	.02	.01	.10	.09	.19	.19
Overall Anger	.11	.08	.11	.07	.07	-.01	-.02	.23	-.04
				Cross-Episode Emotion Specific Recovery					
Overall Sadness	.07	.29*	.16	-.03	.04	.04	.12	.01	.04
Overall Anger	.11	.13	.11	-.18	-.17	-.14	-.12	.29^{+}	.07
Overall Smiling	.28*	.31*	.19	-.06	.00	-.13	-.05	.18	-.11
				Cross-Episode Cross-Emotion Recovery					
Overall Cross-Emotion Recovery	.19	.31*	.17	-.09	-.02	-.05	.04	.13	-.03

$^{+}p < .10$, $*p < .05$, $**p < .001$

Note: [a]N = 65, [b]N = 66, [c]N = 43.

sadness nor anger during the active elicitation phase indicated a trait-like pattern of consistency in relative rank-order; b) Increasing smiling during debriefing phase showed cross-contextual coherence; c) Increasing smiling and diminishing sadness cohered within and across tasks, indicating a coherent and consistent trait pattern; d) Quick and intense sadness reactions during the active elicitation tended to cohere with slower and less complete recovery in sadness during the debriefing phase, consistent with a coherent affective style in sadness reactions but not anger reactions; e) Older children evidenced better overall recovery during debriefing for sadness and smiling but not anger; f) Adherence to display rule was correlated with smiling measures during the recovery phase but not with diminishing sadness or anger; g) effortful control was associated with overall recovery measures from emotionally challenging situations, in particular for sadness and smiling as well as adherence to display rule; h) overall recovery from anger was correlated with teacher ratings of emotion regulation; i) none of the recovery measures predicted maternal ratings of symptoms; j) however, when the effect of age was removed, the relation of effortful control to overall sadness, smiling, and cross-emotion recovery was attenuated.

CHAPTER IV

DISCUSSION

The aim of the current study was to examine the nature of behavioral measures of children's recovery to baseline following debriefing from sadness and anger eliciting tasks, and to investigate behavioral measures of recovery in relation to purported indices of emotion regulation. For this purpose, children's behavioral recovery was observed in three tasks, namely End of the Line, Yarn, and Impossibly Perfect Circles. Each task divided into three phases: baseline, active elicitation and debriefing. Children's anger and sadness reactions were observed in each phase. During debriefing, in addition to children's recovery from anger and sadness, increases in smiling were also observed. Recovery responses were investigated in relation to observational measures of adherence to display rule in Disappointing Gift Paradigm and Effortful Control, maternal reports of internalizing and externalizing problems, and teacher report of emotion regulation and lability/negativity.

The purpose of dividing each task into baseline, active elicitation, and recovery phases was to characterize the time course of emotional responses in psychologically meaningful phases, following the affective chronometry approach (Davidson, 1994, 1998, 2000). In addition, again informed by the affective chronometry approach, during the active elicitation phase of each context, parameters of emotional responses including duration, peak intensity, latency to first response, and during the debriefing phase parameters of emotional responses including latency to lowest intensity level and lowest intensity for sadness and anger, and latency to first response, latency to highest intensity level, duration and peak intensity of smiling, were assessed. Coherence among those parameters of emotional response within and across contexts taps affective style (Davidson, 1998, 2000) or individual differences in emotional reactivity. Davidson (1994) proposed that affective style is associated with

temperament because individual differences in emotion-related activity should reflect a trait-like pattern that are consistent over time and across contexts.

The findings concerning nature of recovery measures assessed within debriefing phase, in relation to active elicitation phase within and across contexts, were discussed first followed by their associations with purported measures of emotion regulation in the literature.

Within and Across Context Coherence in Recovery Measures

End of the Line task was the only context, in which all recovery composites were positively associated with each other. In other words, children who reached lowest levels of anger relatively early tended to reach lowest levels of sadness and display their first smile early as well. However, this pattern was not obtained in the Perfect Circles and Yarn contexts. In all three contexts, children who reached lowest levels of sadness relatively early tended to display their first smile early as well. The diminishing anger responses, however, could not be predicted from diminishing sadness or increasing smiling in the Circles and the Yarn tasks.

To better understand dynamics in the timing of sadness, anger and smiling responses within and across contexts, further analyses were conducted to examine mean-level differences in latency to first smile, latency to lowest level sadness and anger intensity. Table 11 gives the descriptive statistics for latencies within and across contexts[1]. First, one-way within subject ANOVAs for latencies within each task were examined and was found to be significant in all three tasks[2]. The results revealed that children's first smile was observed later than their lowest level sadness and anger expression in all contexts. In addition, children reached lowest level of anger earlier than sadness but this was only true in the End of the Line task. In other words, in End of the Line, anger was the first emotional response to reach its minimum intensity, followed by sadness, followed by the emergence of the first smile. In the

[1] Note that lower scores in latencies indicate quicker recovery in the corresponding emotion.

[2] F (2, 126) = 29.06, $p < .001$ for EL; F (2, 122) = 9.22, $p < .001$ for YR; F (2, 128) = 11.38, $p < .001$ for PC.

other two tasks, anger and sadness reached their minimum in about the same time while the first smiles emerged 12 to 15 seconds later. In addition, in across task comparisons, minimum intensity anger was reached later in Perfect Circles compared to Yarn and End of the Line.[3]

Table 11. *Mean differences within and across contexts in latency scores during recovery phase.*

	End of the Line		Yarn		Perfect Circles	
	M	SD	M	SD	M	SD
Active Phase						
Latency to first						
Sadness	8.54	8.61	72.11	39.38	73.62	46.97
Anger	17.49	12.41	23.11	27.26	30.37	30.10
Within task t	t (63) = -4.40*		t (64) = 9.73*		t (65) = 6.03*	
Recovery Phase						
Latency to lowest level						
Sadness	25.78	20.41	21.44	22.25	20.37	19.91
Anger	15.41	19.62	17.89	17.23	21.91	15.60
Latency to first smile	33.94	21.60	33.52	26.07	33.69	21.61

* $p < .001$

Those differences may explain differential patterns of coherence among recovery measures within End of the Line versus within the Perfect Circles and Yarn tasks. There appears to be a lawful sequence in recovery in the End of the Line task in all three emotional indicators, anger was the first to reach its lowest intensity followed by sadness and followed by the emergence of smiling. It is possible that this lawful sequence in timing of responses, on average, also permitted a coherent relative rank ordering in the rates at which anger and sadness diminished while positive affect emerged only in the End of the Line task but not others in correlational analyses. This interpretation is strengthened when other patterns in mean differences are considered. For example, in mean comparisons, minimum intensity anger and sadness responses were reached about the same time in Yarn and Circles, and in correlational analyses, recovery in anger and sadness did not show coherence. Similarly, in

[3] $F(1, 58) = 4.59$, $p < .05$ for the anger contrast of PC vs EL-YR.

mean comparisons minimum intensity sadness was reached earlier than smiling in Yarn and Circles and in correlational analyses, recovery in sadness cohered with the emergence of smiling.

Other reasons for coherence among all three emotional indicators of recovery in End of the Line task and coherence restricted to sadness and smiling in Perfect Circles and Yarn tasks may have to do with differences in the nature of the tasks. Distress elicitation was short-lived in End of the Line, 30 seconds, whereas distress elicitation lasted 2 minutes in Circles and Yarn contexts. Furthermore, in Circles and Yarn episodes there was a performance criterion that required persistence on a task, whereas in End of the Line no similar constraint was imposed. It is possible those differences in the nature of the tasks alter the nature of the distress experienced during the active elicitation phase and hence the nature of recovery as well.

In additional exploratory analyses, differences in the timing of first anger and first sadness responses during the active elicitation phase were examined. To that end, mean comparisons in latencies to first anger and sadness reactions were compared within and across tasks, also shown in Table 11. Paired sample t-tests for latency to first anger and first sadness reactions within tasks indicated that in End of the Line children first showed sadness followed by anger/frustration, whereas the order was reversed for Circles and Yarn tasks. Furthermore, in across task comparisons, both anger and sadness emerged earlier in End of the Line than in Perfect Circles and Yarn tasks[4].

Those analyses may indicate that End of the Line task may be primarily sadness eliciting context to be followed secondarily by anger (on average about 9 seconds later), whereas Circles and Yarn episodes may be primarily frustration and anger eliciting tasks to be

[4] F (1,61) = 265.20, $p < .001$ for the sadness contrast of EL vs YR-PC; F (1,62) = 10.90, $p < .001$ for the anger constrast of EL vsYR-PC.

followed secondarily by sadness (on average about 45 seconds later). Furthermore, End of the Line context elicited both emotions faster (by 8 seconds sadness had emerged), than the other two contexts (it took 23 seconds for anger to emerge in Circles and 30 seconds in Yarn). It is possible that stimuli which arouse emotional distress quickly but on a short-term basis permit a lawful recovery sequence from distress. In contrast, stimuli which arouse emotion distress more slowly and on a more long-term basis, permit greater individual difference variability in the nature of emotional responses both while the distressing stimuli is present and during recovery, imposing less predictability and coherence in general.

End of the Line task also has a unique characteristic compared to other two tasks which may affect the quick recovery in anger. Mother was present only in this task. That is, the mother was in the room and was busy with her questionnaires. Recall that mothers were asked to stay neutral throughout the session while E interacted with the child. However, the children were able to interact with, look at or talk to their mothers. Therefore, the observed recovery in anger in the End of the Line might be a function of the presence of significant other.

The presence of mother may have affected anger recovery in two ways. First, as Attachment Theory posits (Bowlby, 1973), the mothers might have provided support for their children in this stressful task even if they never interacted with their children. Just knowing that the mother was present may have soothed children and facilitated recovery in anger. Second, the presence of mother may have controlled reactivity in general, especially the anger reactions. Because they were in a highly social context in which both the mother and E were present, the magnitude of anger responses may have been controlled and recovery from anger expressions may have been quicker, as the analyses indicated.

The within-context relations between reactivity in sadness and anger during active elicitation phase and recovery from the corresponding emotion during debriefing phase were also examined. Those correlations, if coherent, would support an affective style view (Davidson, 1994) to emotional reactivity. The correlations supported a coherent affective style in sadness, so that children who showed greater reactivity in sadness during active elicitation had greater difficulty in recovering from sadness. However, the correlations did not support a similar view of anger. In other words, being quick to anger in response to frustration eliciting stimuli did not imply difficulty calming down from anger. The pattern suggested that the relations between the recovery and rising reactivity for sadness constituted coherent parameters of emotional responding for sadness but not in anger.

The consistent emotional responding pattern in sadness suggests that sadness reactions might be more persistent over time and resistant to diminish compared to anger, so that children might have difficulty in returning baseline level once they are saddened. This interpretation is supported by studies conducted with normative or clinical adolescent and adult samples (Davidson, Pizzagalli, Nitschke, & Putnam, 2002; Siegle et al., 2003; Sbarra & Emery, 2005; Reisch, Ebner-Priemer, Tschacher, Bohus, & Linehan, 2008). For example, Sbarra and Emery (2005) investigated emotional experiences following romantic break-ups and reported that the rate of sadness and anger experiences declined differently over time such that high levels of initial sadness showed slower linear and slower decline over a month, while anger diminished more quickly, within a week to 18 days following the break-up.

When cross-contextual coherence among recovery composites was considered on a dimension by dimension basis, smiling was the only dimension to exhibit trait-like properties across contexts. This may reflect, at least in part, the difficulty in reliably capturing signals that are diminishing (e.g. anger and sadness) versus increasing (e.g. smiling) in strength. Discrepancies in internal consistency estimates would support this interpretation. The

Cronbach's alphas for smiling exceeded .90 in every context, whereas the corresponding alphas for anger and sadness ranged from .42 to .74[5].

It is unlikely however, low internal consistency was the only reason for lack of cross-contextual coherence among recovery measures. For example, anger and sadness measures from the active elicitation phase of all three tasks had high alphas, but those measures also failed to show cross-contextual coherence. Hence, a more plausible explanation for lack of cross-contextual coherence in reactivity as well as recovery measures on a dimension by dimension basis may indicate dominance of contexts or situations over trait variance.

The second exception to this pattern of stronger contextual or situational variance relative to trait variance among recovery measures concerned coherence between sadness and smiling measures. Diminishing sadness went hand in hand with increasing smiling not only within tasks but also across tasks. In fact, the patterns of coherence between those two measures within and across tasks appeared to indicate that these measures can be viewed as indicators of a trait-like recovery from emotionally challenging situations. The first smiles emerged consistently after the lowest intensity sadness was reached in all three contexts and those who recovered from sadness more quickly showed more intense positive affective responses during debriefing in each context.

This coherence may be consistent with the restorative function of positive emotions in the stress process (Fredrickson, 2001; Tugade & Fredrickson, 2004). Fredrickson's (1998) Broaden and Build Hypothesis suggested that positive emotions have a significant role in bouncing back from negative emotions by increasing individual's behavioral responses, widening attentional focus, or altering the ways of thinking. In other words, positive emotions have an undoing effect on negative emotions (Fredrickson & Levenson, 1998; Fredrickson,

[5] Note that when all parameters were considered as sadness and anger recovery in the analyses, the reliability and other correlation analyses did not show significant difference.

Mancuso, Branigan, & Tugade, 2000) by creating alternative resources to manage and regulate negative emotions.

The relation of recovery to external variables

The association between recovery measures and the most commonly used indices of emotion regulation in the literature, which are display rule adherence, Effortful Control, behavioral problems, and Emotion Regulation Checklist were examined.

Adherence to display rule in a given context is a recent shift in the operationalization of emotion regulation because this ability requires masking negative emotions in response to a disappointing situation. This competency was positively correlated with Effortful Control, consistent with the idea that effortful control, regulatory aspect of temperament, plays a role in expressive control of negative emotions (Carlson & Wang, 2007), replicating earlier findings. The findings also showed that adherence to display rule was positively associated with Overall Smiling measures in the recovery phase. In other words, children who recovered from emotional distress with larger positive affective responses also adhered to display rule in a disappointing situation.

The correlation of overall smiling with display rule adherence may indicate that the behaviorally observed smiling during recovery phase may not be a real smile. To put it differently, children might show false smiles in response to debriefing statement of E. Non-Duchenne smiles are mostly used for the purpose of hiding a negative emotion or deceiving someone to make him/her believe that one is experiencing positive emotion or being socially polite (Bonanno, Keltner, Noll, Putnam, Trickett, LeJeune, & Anderson, 2002). So, non-Duchenne smiles do not include genuine positive emotion, but rather covers pseudo-expressions in interpersonal contexts.

Considering these characteristics of non-Duchenne smile and the nature of debriefing phase, it is possible that some of the variability in smiling composite does not reflect genuine positive emotion but rather efforts to be responsive to E's apology and be polite toward her. For example, the reactions and statements of E during debriefing might direct children to be polite in response to confusion of E as the structure of debriefing statements includes regret-related words (apology of E for being rude in the End of the Line) or gratitude-related words for their effort in the tasks (thanks of E for drawing circles in the Perfect Circles and for dealing with the clew of yarn strings in the Yarn).

Effortful Control is considered the self-regulatory branch of temperament (Rothbart & Bates, 1998) and is viewed as having an emotion regulatory function (Carlson & Wang, 2007; Eisenberg et al., 2007). The findings supported the view that effortful control may specifically have emotion regulatory role. For example, effortful control was positively associated with Overall Sadness and Smiling recovery, in addition to its correlation with adherence to display rule.

Nevertheless, those significant associations dropped below the significance level when age was partialled out of effortful control. Given low sample size, the age corrected correlation of .16 despite remaining fair in magnitude failed to reach significance. In a larger sample such as 150, a correlation of this magnitude would be declared significant but would also suggest that effortful control does not explain a large proportion of the variability in regulating anger and sadness reactions. Hence, the drop in magnitude of the correlation from moderate to fair indicates that maturational factors induce a coupling between effortful control and recovery from anger and sadness eliciting contexts. Consistent with the development of frontal lobes and other networks in the brain (Rothbart & Bates, 1998; Posner & Rothbart, 2000; Rothbart, Ahadi, & Evans, 2000), children's effortful control abilities

become more mature, stable, and coherent (Kochanska et al., 1996, 1997) and their emotion regulation also becomes better (Calkins & Hill, 2007).

Recovery measures did not reveal significant associations with maternal reports of behavioral problems. Emotional adjustment is only a component of symptoms of behavioral problems, and the latter includes functioning in other domains including attention, cognition and behavior. Although negative emotional reactivity was found to be associated with behavioral problems i.e. high levels of anger reactivity was associated with externalizing problems (Morris, Silk, Steinberg, Terranova, & Kithakye, 2010), none of the reactivity measures were related with behavioral problems in this study. The inconsistent finding between two studies might be due to the differences in the assessment of anger reactivity. Morris and colleagues (2010) assessed anger reactivity in 3-min Disappointing Gift Paradigm. That is, they measured anger reactivity with one paradigm which was not typical for anger elicitation. In addition, they relied only one parameter for anger reactivity, which was intensity. They did not consider different parameters of reactivity, i.e., latency and duration, so their association between reactivity and behavioral problems might be artificially inflated. Nevertheless, in the current study anger reactivity was captured in three different tasks with three parameters. Hence, lack of association of reactivity and recovery with internalizing and externalizing problems in the present study may indicate that behavioral problem ratings are not good measures of functioning in emotion regulation. Batum and Yagmurlu (2007) conducted a study in which they distinguished between emotion and behavior regulation both at the conceptual and measurement level. This purification process between emotion and behavior regulation resulted in two distinct and non-overlapping measures. Their findings indicated that behavior regulation, i.e., attention focusing, attention shifting, impulsivity, and inhibitory control, had a significant influence on externalizing problems because the contribution of emotion regulation was low. In other words, high levels of behavior regulation

was associated with lower levels of externalizing problems even though children were not good at emotion regulation. This finding suggested the central role of behavior regulation rather than emotion regulation in externalizing problems and signified the idea that behavioral problem ratings are distal measures of functioning in emotion regulation.

In contrast to behavior problem ratings, Emotion Regulation Checklist assesses behavioral manifestations of adaptive and maladaptive emotional regulation processes more specifically (Shields & Cicchetti, 1997). Only Overall Anger recovery was positively correlated with emotion regulation, implying that as the rate of anger recovery increased, children were rated as good in adaptive regulation by their teachers. In other words, magnitude of diminishing anger responses was associated with appropriate emotional expressions, empathy, and emotional awareness. Quick recovery from anger in the lab contexts may indicate better adaptation to peer and school contexts as well, and perhaps a general tendency to be lower in affectively driven behavior. There were no other significant correlation among reactivity, recovery, and Emotion Regulation Checklist. It is possible that lack of significant associations also reflect the low sample size in teacher ratings (N ranged from 42 or 43).

Socialization of Emotional Expression

The socialization of children's understanding, experience and expression of emotions plays an important role in their regulation of emotion (Cole & Tamang, 1998; Eisenberg, Cumberland, & Spinrad, 1998). Whether the expression of an emotion or behavior is appropriate or inappropriate in a given social context is shaped by culture (Ellsworth, 1997) and children learn specific skills and behaviors to regulate their emotions consistent with the values of their culture (Zahn-Waxler, 2010).

Collectivistic cultures or cultures of relatedness emphasize harmony of group and value obedience to social norms and expectations of others (Triandis, 1995). Therefore, children are expected to concern with other's expectations of their emotional expressions and to control the expression of their negative emotions because they are regarded as undesirable. For example, Raval and her colleagues (2007) compared the expression of sadness, anger, and pain in the presence of mother, father, and peer among Indian children aged between 5-6 and 8-9. They found that children tended to express anger less than sadness only in the presence of mother, while both anger and sadness were expressed less than pain in the presence of their mother, father, and peers. The most reported reasons for not expressing anger in the presence of mother were avoiding scolding and norm maintenance, while the most reported reason for not expressing sadness in the presence of mothers was a desire to avoid the parental reminder.

As being part of culture of relatedness, children in the current study also tended to express their anger and sadness differently. In active elicitation phase, children expressed sadness more in interpersonal contexts (when they were with experimenter), whereas they expressed anger more in intrapersonal context (when they were alone). The influence of the presence of others were also observed in the End of the Line task and in the report of teachers. In the End of the Line, children's anger reactivity was observed later than their sadness reactivity during active elicitation and children reached to lowest level anger intensity earlier than sadness and smiling. The presence of mother in this highly social context might force children to consider the appropriateness of their anger reactions and to act on socially appropriate way because of the fact that anger is not tolerated as easily as sadness in cultures in which group cohesion and harmony is valued. Similarly, the positive association between anger recovery and emotion regulation reported by teachers might be explained by socialization practices in school context. Children might be more likely to inhibit their

negative emotions and to be lower in affectively driven behavior in order to be accepted by school members, which, in turn, influence children's regulatory behavior in school context.

Summary

The findings indicated that situational variance dominated trait variance in both reactivity and recovery measures. The pattern of associations, hence, was only partially supportive of a coherent response profile consistent with either affective style or temperament. For example, coherence in reactivity to sadness and recovery from sadness was consistent with affective style in sadness but not in anger. In addition, a trait-like pattern for emotional recovery emerged when both smiling and sadness were considered, consistent with the undoing function of positive emotions. Finally, the findings in relation to external validity measures indicated that positive affect was associated with adherence to display rule and both positive affect and recovery from sadness were associated with effortful control.

Strengths and Limitations of the Study

The study used multiple methods for the assessments and independent raters for each coding system. Multi-method measurement included observational measurement, and maternal and teacher reports. Children's effortful control was assessed through behavioral batteries and their adherence to display rule was measured by a well-known paradigm. All behavioral measures were coded by independent raters and assuring minimal shared rater variance. Questionnaires included broad measures of adjustment, including internalizing and externalizing symptoms by mothers, as well as more circumscribed measures of emotional functioning. The multi-method design also minimized the shared method variance. Those methodological features assured that in a low statistical power environment, correlations were not artificially inflated.

Although the present study has contributed to the current literature, it is not without its limitations. First, low sample size hampered confidence in inferences throughout. Second, the

tasks differed in the onset and end of the debriefing statements given by the E. Therefore, it was difficult to mark the end of the debriefing during coding. Future studies may benefit from more careful specification of affective responses as the debriefing statements are delivered and affective responses following the end of debriefing. Third, future studies may benefit from examining behavioral recovery measures with concurrently collected physiological measures during recovery. Such studies may inform discrepancies between the behavioral and physiological responses in a given emotion system, which may inform both our understanding of recovery from emotional challenging situations. For example, Mauss and her colleagues (2005) reported that experiential (i.e. subjective ratings) and observed behavioral responses were highly coherent, yet physiological responses were modestly related to experience and behavior. Therefore, including multi-level assessment of emotion response system will lead to a better understanding of emotional reactivity, emotional recovery and their relations to broader measures of functioning.

REFERENCES

Achenbach, T. M. (1991). Integrative guide for the 1991 CBCL/4-18. YSR and TRF profiles. Burlington: University of Vermont Department of Psychiatry.

Ahadi, S. A., Rothbart, M. K., & Ye, R. (1993). Children's temperament in the US and China: similarities and differences. *European Journal of Personality, 7*, 359-377.

Batum, P. & Yagmurlu, B. (2007). What counts in externalizing behaviors? the contributions of emotion and behavior regulation. *Current Psychology, 25*(4), 272-294.

Bodner, A. C. (2007). Effortful control and young children's emotional responses to a competitive task. Unpublished doctorate dissertation. Illinois: Illinois State University.

Bonanno, G. A., Keltner, D., Noll, J. G., Putnam, F. W., Trickett, P. K., LeJeune, J., & Anderson, C. (2002). When the face reveals what words do not: facial expressions of emotion, smiling, and the willingness to disclose childhood sexual abuse. *Journal of Personality and Social Psychology, 83*(1), 94-110.

Bowlby, J. (1973) *Attachment and loss: Volume 2. Separation: Anxiety and anger,* New York: Basic Books.

Buss, K. A., & Goldsmith, H. H. (1998). Fear and anger regulation in infancy: effects on the temporal dynamics of affective expression. *Child Development, 69*(2), 359-374.

Calkins, S.D. & Hill, A. (2007). Caregiver influences on emerging emotion regulation: biological and environmental transactions in early development. In J. Gross & R. Thompson (Eds.), *The Handbook of Emotion Regulation* (pp. 229-248). The Guilford Press.

Calkins, S. D., Gill, K. L., Johnson, M. C., & Smith, C. L. (1999). Emotional reactivity and emotional regulation strategies as predictors of social behavior with peers during toddlerhood. *Social Development, 8*(3), 310-334.

Calkins, S. D., & Keane, S. P. (2003). Cardiac vagal regulation across the preschool period: stability, continuity, and implications for childhood adjustment. *Developmental Psychobiology, 45*(3), 101-112.

Campos, J. J., Mumme, D. L., Kermoian, R., & Campos, R. G. (1994). A functionalist perspective on the nature of emotion. In N. A. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59*(2-3, Serial No. 240), 284-303.

Carlson, S. M., & Wang, T. S. (2007). Inhibitory control and emotion regulation in preschool children. *Cognitive Development, 22,* 489-510.

Cicchetti, D., Ganiban, J., & Barnett, D. (1991). Contributions from the study of high-risk populations to understanding the development of emotion regulation. In J. Garber & K. A. Dodge (Ed.), *The development of emotion regulation and dysregulation*. (pp.15-48). Cambridge: Cambridge University Press.

Cole, P. M. (1986). Children's spontaneous expressive control of facial expression. *Child Development, 57*, 1309-1321.

Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: methodological challenges and directions for child development research. *Child Development, 75*(2), 317-333.

Cole, P. M., & Tamang, B. L. (1998). Nepali children's ideas about emotional displays in hypothetical challenges. *Developmental Psychology, 34*(4), 640-646.

David, K. M., & Murphy, B. C. (2007). Interparental conflict and preschoolers' peer relations-the moderating roles of temperament and gender. *Social Development, 16*(1), 1-23.

Davidson, R. J. (2004).Well-being and affective style: neural substrates and biobehavioral correlates. *Philosophical Transactions of the Royal Society of London. B, 359,* 1395-1411.

Davidson, R. J. (2000). Neuropsychological perspectives on affective styles and their cognitive consequences. In T. Dalgleish & M. Power (Eds.). *Handbook of Cognition and Emotion.* (pp. 103-124). John Wiley & Sons Ltd.

Davidson, R. J. (1998). Affective style and affective disorders: perspectives from affective neuroscience. *Cognition and Emotion, 12*(3), 307-330.

Davidson, J. R. (1994). On emotion, mood, and related affective construct. In P. Ekman & R. J. Davidson (Eds). *The nature of emotion: Fundamental questions.*(pp. 51-55). Oxford University Press.

Davidson, R. J., Jackson, D. C., & Kalin, N. H. (2000). Emotion, plasticity, context, and regulation: perspectives from affective neuroscience. *Psychological Bulletin, 126*(6), 890-909.

Davidson, R. J., Pizzagalli, D., Nitschke, J. B., & Putnam, K. (2002). Depression: perspectives from affective neuroscience. *Annual Review of Psychology, 53,* 545-574.

Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*(4), 241-273.

Eisenberg, N., Cumberland, A., Spinrad, T. L., Fabes, R. A., Shepard, S. A., Reiser, M., et al. (2001). The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child Development, 72,* 1112–1134.

Eisenberg, N., Fabes, R. A., Karbon, M., Murphy, B. C., Wosinski, M., Polazzi, L., Carlo, G., & Juhnke, C. (1996). The relations of children's dispositional prosocial behavior to emotionality, regulation, and social functioning. *Child Development, 67,* 974-992.

Eisenberg, N., Fabes, R. A., Shepard, S. A., Murphy, B. C., Guthrie, I. K., Jones, S., Friedman, J., Poulin, R., & Maszk, P. (1997). Contemporaneous and longitudinal prediction of children's social functioning from regulation and emotionality. *Child Development, 68*(4), 642-664.

Eisenberg, N., Ma, Y., Chang, L., Zhou, Q., West, S. G., & Aiken, L. (2007). Relations of effortful control, reactive undercontrol, and anger to Chinese children's adjustment. *Development and Psychopathology, 19,* 385–409.

Eisenberg, N., & Spinrad, T. L. (2004). Emotion-related regulation: sharpening the definition. *Child Development, 75*(2), 334-339.

Eisenberg, N., Valiente, C., Spinrad, T. L., Cumberland, A., Liew, J., Reiser, M., Zhou, Q., & Losoya, S. H., (2009). Longitudinal relations of children's effortful control, impulsivity, and negative emotionality to their externalizing, internalizing, and co-occuring behavior problems. *Developmental Psychology, 45*(4), 988-1008.

Eisenberg, N., Zhou, Q., Spinrad, T. L., Valiente, C., Fabes, R. A., & Liew, J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. *Child Development, 76,* 1055-1071.

Ellsworth, P. C. (1997). Sense, Culture, and Sensibility. In S. Kitayama & H. R. Markus (Eds.). *Emotion and Culture.* (pp. 133-196). American Psychological Association.

Else-Quest, N. M., Hyde, J. S., Goldsmith, H. H., & van Hulle, C. A. (2006). Gender differences in temperament: a meta-analysis. *Psychological Bulletin, 132*(1), 33-72.

Essex, M. J., Boyce, W. T., Goldstein, L., Armstrong, J. M., Kraemer, H. C., & Kupfer, D. J. (2002). The confluence of mental, physical, social, and academic difficulties in middle childhood II: developing the MacArthur health and behavior questionnaire. *Journal of American Academy of Child & Adolescent Psychiatry, 41*(5), 588-603.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist: Special Issue, 56*, 218–226.

Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology: Special Issue: New Directions in Research on Emotion, 2,* 300–319.

Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion, 12,* 191–220.

Fredrickson, B. L., Mancuso, R. A., Branigan, C., & Tugade, M. M. (2000). The undoing effect of positive emotions. *Motivation and Emotion, 24*, 237–258.

Goldsmith, H. H., & Davidson, R. J. (2004). Disambiguating the components of emotion regulation. *Child Development, 75*(2), 361-365.

Goldsmith, H. H., Reilly, J., Lemery, K. S., Longley, S., & Prescott, A. (1995). *Preliminary manual for the Preschool Laboratory Temperament Assessment Battery (Version 0.5).* Department of Psychology, University of Wisconsin, Madison.

Gottman, J. M., & Katz, L. F. (2002). Children's emotional reactions to stressful parent-child interactions: the link between emotion regulation and vagal tone. *Marriage & Family Review, 34*(3), 265-283.

Gross, J. J. (1999). Emotion and emotion regulation. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed.; pp.525–552). New York: Guilford.

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: conceptual foundations. In J. J. Gross (Eds), *Handbook of Emotion Regulation,* (pp. 3-26). New York: Guilford.

Harman, C., Rothbart, M. K., & Posner, M. I. (1997). Distress and attention interactions in early infancy. *Motivation and Emotion, 21*(1), 27-43.

Hemenover, S. H. (2003). Individual differences in rate of affect change: studies in affective chronometry. *Journal of Personality and Social Psychology, 85*(1), 121-131.

Huey, S. J., & Weisz, J. R. (1997). Ego control, ego resiliency, and the five-factor model as predictors of behavioral and emotional problems in clinic-referred children and adolescents. *Journal of Abnormal Psychology, 106*(3), 404-415.

Jackson, D. C., Mueller, C. J., Dolski, I., Dalton, K. M., Nitscke, J. B., Rosenkranz, M. A., Ryff, C. D., Singer, B. H., & Davidson, R. J. (2003). Now you feel it, now you don't: frontal brain electrical symmetry and individual differences in emotion regulation. *Psychological Science, 14*(6), 612-617.

Karreman, A., van Tuijl, C., van Aken, M. A. G., & Dekovic, M. (2009). Predicting young children's externalizing problems. *Merrill-Palmer Quarterly, 55*(2), 111-134.

Keane, S. P., & Calkins, S. D. (2004). Predicting kindergarten peer social status from toddler and preschool problem behavior. *Journal of Abnormal Child Psychology, 32,* 409–423.

Keenan, K. (2000). Emotion dysregulation as a risk factor for child psychopathology. *Clinical Psychology: Science and Practice, 7,* 418-434.

Kieras, J. E., Tobin, R. M., Graziano, W. G., & Rothbart, M. K. (2005). You can't get always what you want: effortful control and children's responses to undesirable gift. *Psychological Science, 16*(5), 391-396.

Kochanska, G., Coy, K. C., & Murray, K. T. (2001). The development of self-regulation in the first four years of life. *Child Development, 72*(4), 1091-1111.

Kochanska, G., & Knaack, A. (2003). Effortful control as a personality characteristic of young children: antecedents, correlates, and consequences. *Journal of Personality, 71*(6), 1087-1112.

Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child Development, 68,* 263-277.

Kochanska, G., Murray, K. T., & Harran, H. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36,* 220-232.

Kochanska, G., Murray, K., Jacques, T. Y., Koenig, A. N., & Vandegeest, K. A. (1996). Inhibitory control in young children and its role in emerging internalization, *Child Development, 67,* 490- 507.

Lemery-Chalfant, K., Doelger, L., & Goldsmith, H. H. (2008s). Genetic relations between effortful and attentional control and symptoms of psychopathology in middle childhood. *Infant and Child Development, 17,* 365-385.

Lewis, M. D., & Stieben, J. (2004). Emotion regulation in the brain: conceptual issues and directions for developmental research. *Child Development, 72*(2), 371-376.

Morris, A. S., & Silk, J. S., Steinberg, L., Terranova, A. M., & Kithakye, M. (2010). Concurrent and longitudinal links between children's externalizing behavior in school and observed anger regulation in the mother-child dyad. *Journal of Psychopathology and Behavioral Assessment, 32*(1), 48-56.

Murray, K. T., & Kochanska, G. (2002). Effortful control: factor structure and relation to externalizing and internalizing behaviors. *Journal of Abnormal Child Psychology, 30*(5), 503-514.

Olson, S. L., Sameroff, A. J., Kerr, D. C. R., Lopez, N. L., & Wellman, H. M. (2005). Developmental foundations of externalizing problems in young children: the role of effortful control. *Development and Psychopathology, 17*, 25-45.

Porges, S. W. (1992). Vagal tone: a physiologic marker of stress vulnerability. *Pediatrics, 90*(3), 498-504.

Porges, S. W. (1997). Emotion: an evolutionary by-product of the neural regulation of the autonomic nervous system. *Annals of the New York Academy of Sciences, 807,* 62-77.

Porges, S. W., Doussard-Roosevelt, J. A., Portales, A. L., & Greenspan, S. I. (1996). Infant regulation of the vagal brake predicts child behavior problems: a psychobiological model of social behavior. *Developmental Psychobiology, 29*(8), 697-712.

Posner, M. I., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development and Psychopathology, 12,* 427-441.

Raval, V. V., Martini, T. S., & Raval, P. H. (2007). Would others think it is okay to express my feelings? Regulation of anger, sadness and physical pain in Gujarati children in India. *Social Development, 16*(1), 79-105.

Reisch, T., Ebner-Priemer, U. W., Tschacher, W., Bohus, M., & Linehan, M. M. (2008). Sequences of emotions in patients with borderline personality disorder. *Acta Psychiatrica Scandinavia, 118*, 42-48.

Robins, R. W., John, O. P., Caspi, A., Moffitt, T. E., Stouthamer-Loeber, M. (1996). Resilient, overcontrolled, and undercontrolled boys: three replicable personality types. *Journal of Personality and Social Psychology, 70*(1), 157-171.

Rothbart, M. K., & Ahadi, S. A. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology, 103*(1), 55-66.

Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology, 78*, 122-135.

Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigation of temperament at three to seven years: the children's behavior questionnaire. *Child Development, 72*(5), 1394-1408.

Rothbart, M. K., & Bates, J. E. (1998). Temperament. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed.). New York: Wiley.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed.). New York: Wiley.

Rothbart, M. K., & Derryberry, D. (1981). Development of individual differences in temperament. In M. E. Lamb & A. L. Brown (Eds.), *Advances in developmental psychology* (Vol. 1, pp. 37–86). Hillsdale, NJ: Erlbaum.

Rothbart, M. K., Ellis, L. K., Rueda, M. R., & Posner, M. I. (2003). Developing mechanisms of temperamental effortful control. *Journal of Personality, 71*(6), 1113-1143.

Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigation of temperament at three to seven years: the children's behavior questionnaire. *Child Development, 72*(5), 1394-1408.

Rothbart, M. K., & Posner, M. I. (2005). Genes and experience in the development of executive attention and effortful control. *New Directions for Child and Adolescent Development, 109,* 101-108.

Rottenberg, J., Wilhelm, F. H., Gross, J. J., & Gotlib, I. H. (2003). Vagal rebound during resolution of tearful crying among depressed and nondepressed individuals. *Psychophysiology, 40,* 1-6.

Saarni, C. (1984). An observational study of children's attempts to monitor their expressive behavior. *Child Development, 55*, 1504-1513.

Santucci, A. K., Silk, J. S., Shaw, D. S., Gentzler, A., Fox, N. A., & Kovacs, M. (2008). Vagal tone and temperament as predictors of emotion regulation strategies in young children. *Developmental Psychobiology, 50,* 205-216.

Sbarra, D. A., & Emery, R. E. (2005). The emotional sequelae of nonmarital relationship dissolution: analysis of change and intraindividual variability over time. *Personal Relationships, 12,* 213-232.

Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: the development and validation of a new criterion q-sort scale. *Developmental Psychology, 33*(6), 906-916.

Siegle, G. J., Steinhauer, S. R., Carter, C. S., Ramel, W., & Thase, M. E. (2003). Do the seconds turn into hours? Relationships between sustained pupil dilation in response to emotional information and self-reported rumination. *Cognitive Therapy and Research, 27*(3), 365-382.

Spinrad, T. L., Eisenberg, N., Gaertner, B., Popp, T., Smith, C. L., Kupfer, A., Greving, K., Liew, J., & Hofer, C. (2007). Relations of maternal socialization and toddlers' effortful control to children's adjustment and social competence. *Developmental Psychology, 43*(5), 1170-1186.

Stifter, C. A., & Braungart, J. M. (1995). The regulation of negative reactivity in infancy: function and development. *Developmental Psychology, 31*(3), 448-455.

Thompson, R. A. (1994). Emotion regulation: In search of definition. In N. A. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59*(2-3, Serial No. 240), 25 – 52.

Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.

Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology, 86*(2), 320-333.

Valiente, C., Eisenberg, N., Spinrad, T., Reiser, M., Cumberland, A., Losoya, S., & Liew, J. (2006). Relations among mothers' expressivity, children's effortful control, and their problem behaviors: A four-year longitudinal study. *Emotion*, *6*, 459-472.

Zahn-Waxler, C. (2010). Socialization of emotion: who influences whom and how? In A. Kennedy Root & S. Denham (Eds.), *The role of gender in the socialization of emotion: Key concepts and critical issues. New Directions for Child and Adolescent Development, 128,*101–109. San Francisco: Jossey-Bass.

APPENDICES

APPENDIX A - END OF THE LINE

İlk üzüntüye kadar geçen süre _____ (hiç = 31)

İlk öfkeye kadar geçen süre _____ (hiç = 31) (karşı çıkma-protesto dahil)

Sebep sorana dek geçen süre _____ (hiç = 31)

Bırakana kadar dek geçen süre _____ (hiç = 31)

Not: Aşağıdaki tabloda belirtilen üzüntü, öfke ve ilgi ifadeleri görülüyorsa 1 görülmüyorsa 0 verilir. Şiddet düzeylerinin tanımları ek sayfadadır.

Dakika 1:	**5**	**10**	**15**	**20**	**25**	**30**	**Say**	**En yüksek Şiddet (0-3)**
Üzüntü (0-1)								
Öfke/ Kızgınlık/ Hor görme(0-1)								
İlgili/ uğraşıyor								

Dilim sayısı ____

Debriefing phase + 10seconds

İlk gülümseye kadar geçen süre _____ (hiç = 61)

Her 5 saniyelik dilimde açıklamanın yapılıp yapılmadığını işaretle

Açıklama + 10 sn	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**Say**	**En yüksek Şiddet (0-3)**
Açıklama														
Üzüntü (0-1)														
Öfke/ Kızgınlık/ Hor görme(0-1)														

Üzüntünün en düşük düzeyi (0-3): _____ Bu şiddet düzeyine kadar geçen süre _____

Öfke/asabiyetin en düşük düzeyi (0-3): _____ Bu şiddet düzeyine kadar geçen süre _____

Dilim sayısı: _____

APPENDIX B – IMPOSSIBLY PERFECT CIRCLES

İlk 2 dakika sırasında

İlk üzüntüye kadar geçen süre ____(hiç = 121) İlk öfkeye kadar geçen süre ___(hiç = 121)

Uğraşmayı bırakana kadar geçen süre __(hiç = 121) Ek daire çizmeyi reddene kadar geçen sür_(hiç = 121)

Not: Aşağıdaki tabloda belirtilen üzüntü ve öfke ifadeleri duruma yönelikse 1, Ar.'ya yönelik ise 2 verilmelidir. (Bu ayrıştırmaların ve şiddet düzeylerinin tanımları ek sayfadadır.) Kaygı ve uğraşı/ilgi gözlemleniyorsa 1 gözlemlenmiyorsa 0 verilir.

Dakika 1:	**5**	**10**	**15**	**20**	**25**	**30**	**Say**	**Şiddet**	**35**	**40**	**45**	**50**	**55**	**60**	**Say**	**En yüksek şiddet (0-3)**
Üzüntü (0-2)							1__ _								1__ _	
Öfke/Kızgınlık/Hor görme(0-2)							1__ _								1__ _	
Kaygı (0-1)																
İlgili/ uğraşıyor																

Dilim sayısı ____ Dilim sayısı ____

Dakika 2:	**5**	**10**	**15**	**20**	**25**	**30**	**Say**	**Şiddet**	**35**	**40**	**45**	**50**	**55**	**60**	**Say**	**En yüksek şiddet (0-3)**
Üzüntü (0-2)							1__ _								1__ _	
Öfke/kızgınlık/Hor görme(0-2)							1__ _								1__ _	
Kaygı (0-1)																
İlgili/ uğraşıyor																

Dilim sayısı ____ Dilim sayısı ____

Debriefing phase + 10seconds

İlk gülümseye kadar geçen süre _____ (hiç = 61)

Her 5 saniyelik dilimde açıklamanın yapılıp yapılmadığını işaretle

Açıklama + 10 sn	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**Say**	**En yüksek şiddet (0-3)**
Açıklama														
Üzüntü														
Öfke/Kızgınlık/Hor görme(0-2)														

Üzüntünün en düşük düzeyi (0-3): _____Bu şiddet düzeyine kadar geçen süre _____

Öfke/asabiyetin en düşük düzeyi (0-3): _____ Bu şiddet düzeyine kadar geçen süre _____

Dilim sayısı: _____

APPENDIX C - YARN

İlk 2 dakika sırasında

İlk üzüntüye kadar geçen süre ____ (hiç = 121) İlk öfkeye kadar geçen süre _____ (hiç = 121)
Uğraşmayı bırakana kadar geçen süre ___(hiç = 121)
A'dan yardım isteyene kadar geçen süre _____ (hiç = 121)

Not: Aşağıdaki tabloda belirtilen üzüntü, öfke ve ilgi ifadeleri görülüyorsa 1 görülmüyorsa 0 verilir. Şiddet düzeylerinin tanımları ek sayfadadır.

Dakika 1:	**5**	**10**	**15**	**20**	**25**	**30**	**Say**	**Şiddet**	**35**	**40**	**45**	**50**	**55**	**60**	**Say**	**En yüksek şiddet (0-3)**
Üzüntü																
Öfke/Kızgınlık/Kösteklenme																
İlgili/ uğraşıyor																

Dilim sayısı ____ Dilim sayısı ____

Dakika 2:	**5**	**10**	**15**	**20**	**25**	**30**	**Say**	**Şiddet**	**35**	**40**	**45**	**50**	**55**	**60**	**Say**	**En yüksek şiddet (0-3)**
Üzüntü																
Öfke/Kızgınlık/Kösteklenme																
İlgili/ uğraşıyor																

Dilim sayısı ___ Dilim sayısı ____

Debriefing phase + 10seconds

İlk gülümseye kadar geçen süre _____ (hiç = 61)

Her 5 saniyelik dilimde açıklamanın yapılıp yapılmadığını işaretle

Açıklama + 10 sn	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**Say**	**En yüksek şiddet (0-3)**
Açıklama														
Üzüntü														
Öfke/Kızgınlık/Kösteklenme														

Üzüntünün en düşük düzeyi (0-3): _____ Bu şiddet düzeyine kadar geçen süre _____

Öfke/asabiyetin en düşük düzeyi (0-3): _____ Bu şiddet düzeyine kadar geçen süre _____

Dilim sayısı: _____

APPENDIX D – DISAPPOINTING GIFT

	Kendi Başına								**Ar. İçeride**						
	5	10	15	20	25	30	35		5	10	15	20	25	30	35
Gülümseme (0-1)															
Hüsran (0-1)															
Kızgınlık (0-1)															
Hesap sorma (0-1)															
Olumlu cevap (0-1)															
Olumsuz tepki (0-1)															

! Bilgilendirmeden sonrası kodlanmayacak.

Kritere dek geçen süreler: İlk gülümsemeye dek _____ *hiç yapmadıysa; 75 sn

Hüsrana dek _____

Kızgınlığa dek _____

Hesap sorana dek _____

Olumlu cevaba dek _____

Olumsuz tepkiye dek _____

Toplam süreler:

Kendi Başına iken	**Ar. İçeride iken**
Gülümseme _____	Gülümseme _____
Hüsran _____	Hüsran _____
Kızgınlık _____	Kızgınlık _____
Hesap sorma _____	Hesap sorma _____
Olumlu cevap _____	Olumlu cevap _____
Olumsuz tepki _____	Olumsuz tepki _____
Dilim sayısı _____	Dilim Sayısı _____

Gülümseme Şiddeti (0-3): **Kendi başına**: _____ **Ar. İçeride** _____

APPENDIX E – EFFORTFUL CONTROL

Köprü Çizme

	Toplam süre
Referans	_____
Hızlı	_____
Yavaş	_____

Çarpık Çizgide Üzerinde Yavaşça Yürüme

	Toplam süre	**Hatalar** (çizginin dışına çıkma)
Referans	_____	_____
Yavaş #1	_____	_____
Yavaş #2	_____	_____

Hediye Paketi

Paketleme Süreci: Başlama zamanı _____

Zaman *Süre*

Sabırsızlık gösterisi: _____ _____

Tanım: Bakmadan ya da yerinden kalkmadan sabırsızlık gösterme, ör durum hakkında konuşmak hadi demek, vb., kıpır kıpır olmak (Ç sabırsızlık göstermediyse 60 sn)

Bakma/oturma:		*Zaman*	*Süre*
Ç arkasına döner ve tekrar önüne dönmez.	1	_____	_____
Ç arkasına döner/ kalkar, ama sonra tekrar önüne döner/oturur.	2	_____	_____
Ç hediyeyi görebileceği şekilde omzunun üzerinden bakar.	3	_____	_____
Ç kafasını 90 dereceden daha az yana çevirir.	4	_____	_____
Ç bakmaya çalışmaz.	5	_____	_____
		(Ç hiç bakmadı/ kalkmadıysa 60 sn)	

Aldığı en düşük bakma/oturma kodu_____

Not: Geçerli her davranış için zaman ve süre yazılır. Aldığı en düşük puan ayrıca not edilir. Hiç göstermediklerinin ise zaman ve süreleri boş bırakılır.

Kurdele bekleme süreci: Başlama zamanı _____

Zaman *Süre*

Sabırsızlık gösterisi: _____ _____

Tanım: Dokunmadan ya da yerinden kalkmadan sabırsızlık gösterme,Ör durum hakkında konuşmak hadi demek, vb., Kıpır kıpır olmak (Ç sabırsızlık göstermediyse 180 sn)

Oturma kodu:		*Zaman*	*Süre*
Ç süre bitmeden kalktı.	0	_____	_____
Ç süre bitene kadar oturdu.	1		
Dokunma kodu:		*Zaman*	*Süre*
Ç hediyeyi açar.	1	_____	_____
Ç hediyeyi kaldırır/ alır.	2	_____	_____
Ç hediyeye dokunur fakat kaldırmaz.	3	_____	_____
Ç hediyeye hiç dokunmaz.	4	_____	_____
		(Hiç dokunmadıysa 180 sn)	

Aldığı en düşük dokunma kodu _____

***Not*:** Geçerli her dokunma kodu zaman ve süre yazılır. Aldığı en düşük puan ayrıca not edilir. Hiç göstermediklerinin ise zaman ve süreleri boş bırakılır.

Kendini Denetleme Becerisi- TIME 2

Ritim Tutma

Dn1 (Bir) ____	Dn7 (İki) ____	Dn1 (Bir) ____	Dn7 (0) ____
Dn2 (İki) ____	Dn8 (Bir) ____	Dn2 (İki) ____	Dn8 (İki) ____
Dn3(İki) ____	Dn9(Bir) ____	Dn3(0) ____	Dn9(Bir) ____
Dn4 (Bir) ____	Dn10 (İki) ____	Dn4 (İki) ____	Dn10 (İki) ____
Dn5 (İki) ____	Dn11 (Bir) ____	Dn5 (Bir) ____	Dn11 (Bir) ____
Dn6 (Bir) ____	Dn12 (İki) ____	Dn6 (0) ____	Dn12 (0) ____

Kış/Yaz

Her deneme için kodlar: (0) Ritim tutmaz; (1) Yanlış cevap verir ve kendini düzeltmez (ya da doğru cevap verir ama fikir değiştirir); (2) Kendini düzeltir; (3) Doğru cevap verir ve fikrini değiştirmez.

Deneme 1 (kış)	_____	Deneme 7 (kış)	_____
Deneme 2 (kış)	_____	Deneme 8 (yaz)	_____
Deneme 3 (yaz)	_____	Deneme 9 (yaz)	_____
Deneme 4 (kış)	_____	Deneme 10 (kış)	_____
Deneme 5 (yaz)	_____	Deneme 11 (yaz)	_____
Deneme 6 (yaz)	_____	Deneme 12 (kış)	_____

3'lerin sayısı: __; 2'lerin sayısı ___; 1'lerin sayısı ___; 0'ların sayısı __; Toplam deneme sayısı____

Kukla oyunu (Ayı/Canavar)

Her ayı komutu için: (Hareket /aktivasyon (**activation**) kodunu temsil eder)
Ç hiç bir hareket yapmaz. 0 (no activation)
Ç düzeltme niyetli kısmi bir hareket yapar 1
Ç söylenenden farklı bir hareket yapar. 2
Ç söylenen hareketi doğru/tam yapar. 3
Her canavar komutu için: (Denetleme/ engelleme (**inhibition**) kodunu temsil eder)
Ç söylenen hareketi tam yapar. 0
Ç söylenenden farklı bir hareket yapar. 1
Ç kısmi bir hareket/düzeltme yapar. 2 (başını sallayıp/ hayır demek de burada kodlanır)
Ç hiç bir hareket yapmaz. 3

	Ayı komutları					Canavar komutları			
	Tam	Farklı	Kısmi	Hiç		Tam	Farklı	Kısmi	Hiç
1. Dil çıkar	3	2	1	0	1. Kulağını göster	0	1	2	3
2. Göz kırp	3	2	1	0	2. El çırp	0	1	2	3
3. El çırp	3	2	1	0	3. Göz Kırp	0	1	2	3
4. Burun sümkür	3	2	1	0	4. Dizini kaldır	0	1	2	3
5. Dudağını göster	3	2	1	0	5. Burun sümkür	0	1	2	3
6. Dizini kaldır	3	2	1	0	6. Ayağını yere vur	0	1	2	3
7. Bacağını göster	3	2	1	0	7. El salla	0	1	2	3
8. El salla	3	2	1	0	8. Dil Çıkar	0	1	2	3
9. Ayağını yere vur	3	2	1	0	9. Dudağını göster	0	1	2	3

Ayı hareket toplamı: _____ **Canavar denetleme toplamı: _____**

Ayı için: **3'lerin sayısı: ___ ; 2'lerin sayısı: __; 1'lerin sayısı: __; 0'ların sayısı: __; Toplam deneme sayısı: _____**

Canavar için: **3'lerin sayısı: __; 2'lerin sayısı: __; 1'lerin sayısı: __; 0'ların sayısı: __;Toplam deneme sayısı: _____**

APPENDIX F – MacArthur HEALTH AND BEHAVIOR QUESTIONNAIRE

Aşağıda çocukların bazı özelliklerini tanımlayan bir dizi madde bulunmaktadır. Her bir madde **çocuğunuzun şu andaki ya da son 6 ay** içindeki durumunu belirtmektedir. Bir madde çocuğunuz için **çok ya da sıklıkla ise 2, bazen ya da biraz doğru ise 1, hiç doğru değilse 0** sayılarını yuvarlak içine alınız. Lütfen tüm maddeleri işaretlemeye çalışınız.

0 : Doğru değil (Bildiğiniz kadarıyla) 1: Bazen ya da Biraz Doğru 2: Çok ya da Sıklıkla Doğru

0	**1**	**2**	1.Kıpır kıpırdır.	**0**	**1**	**2**	23.Eşyalara zarar verir (ör: yıkar,kırıp döker, bozar).
0	**1**	**2**	2.Gelecekte olabilecek şeylerden dolayı endişeye kapılır	**0**	**1**	**2**	24.İşstahsızdır, acıkmaz.
0	**1**	**2**	3.Öfke nöbetleri geçirir.	**0**	**1**	**2**	25.Kendi başına oynamayı tercih eder.
0	**1**	**2**	4.Bir arkadaşına kızdığı zaman, onu oyun grubundan dışlar.	**0**	**1**	**2**	26.Oyunlarda yada grup faaliyetlerinde sırasını beklemekte zorluk yaşar.
0	**1**	**2**	5.Yakın olduğu kişilerin başına kötü şeyler gelirse endişeye kapılır.	**0**	**1**	**2**	27.Yangın çıkarır.
0	**1**	**2**	6.Hırsızlık yapar; kendisine ait olmayan şeyleri izinsiz alır.				Tıbbi nedenli olmayan fiziksel sorunlardan;
0	**1**	**2**	7.Uykuya dalmakta güçlük çeker.	**0**	**1**	**2**	28.Ağrı sızıları vardır.
0	**1**	**2**	8.Oturması gereken durumlarda yerinde oturamaz.	**0**	**1**	**2**	29.Başağrıları vardır.
0	**1**	**2**	9.Geçmişte yaptıklarından dolayı kaygılanır, endişeye kapılır.	**0**	**1**	**2**	30.Midesi bulanır.
0	**1**	**2**	10.Genelde tek başına olan bir çocuktur.	**0**	**1**	**2**	31.Mide ağrıları vardır.
0	**1**	**2**	11.Sık sık yetişkinlerle tartışmaya girer.	**0**	**1**	**2**	32.Diğer çocuklara, bir arkadaşlarıyla oynamamalarını,onunla arkadaşlık
0	**1**	**2**	12.Sık sık akranlarıyla tartışmaya girer.	**0**	**1**	**2**	33.Başkalarını sinir eden (kızdıran) şeyler yapar.
0	**1**	**2**	13.Sevdiği kişilerden ayrılacağı zaman endişeye kapılır.	**0**	**1**	**2**	34. Uyuyana kadar ebeveyenleri yakınında olmazsa korkar.
0	**1**	**2**	14.Yalan söyler, hile yapar.	**0**	**1**	**2**	35.Hayvanlara eziyet eder,acımasızca davranır.
0	**1**	**2**	15.Gündüz ve/veya geceleri akranlarından fazla uyur.	**0**	**1**	**2**	36.Kendi başına olmaktan hoşlanır.
0	**1**	**2**	16.Düşünmeden hareket eder.	**0**	**1**	**2**	37.Söz keder, ona yöneltilen sorulara çok çabuk cevap verir.
0	**1**	**2**	17.Bir arkadaşının diğer çocuklar tarafından sevilmemesi için uğraşır.	**0**	**1**	**2**	38. Sıkılgan ve utangaçtır.
0	**1**	**2**	18.Dikkati çabuk dağılır,dikkatini belli bir faaliyete yoğunlaştırmakta güçlük çeker.	**0**	**1**	**2**	39.Kendi hataları, yaramazlıkları için başkalarını suçlar.
0	**1**	**2**	19.Diğer çocuklara alaycı ve iğneleyeci davranır.	**0**	**1**	**2**	40. Yalnız kalmaktan kaçınır.
0	**1**	**2**	20.Daha iyi veya daha başarılı olabilecek miyim diye kaygı yaşar.	**0**	**1**	**2**	41.Fiziksel olarak insanlara saldırır,vurur.
0	**1**	**2**	21.Yetişkinlere karşı gelir,meydan okur.	**0**	**1**	**2**	42.Diğer çocuklarla birlikteyken çekingendir.

0	**1**	**2**	22.Evde kalmak için okula gitmekten kaçınır.	**0**	**1**	**2**	43.Kendisine verilen yönergeleri izlemekte zorluk çeker.

0 : Doğru değil (Bildiğiniz kadarıyla) 1: Bazen ya da Biraz Doğru 2: Çok ya da Sıklıkla Doğru

0	**1**	**2**	44.Arkadaşı istediğini yapmazsa,onunla oynamayacağını,arkadaşlık etmeyeceğini	**0**	**1**	**2**	65.Kendine yakın hissettiği birinden uzaktayken aşırı sıkıntı duyar.
0	**1**	**2**	45.Rahatlamak için işlerin yolunda olduğunu sürekli söylemesi gerekir.	**0**	**1**	**2**	66.Küfreder veya edebe aykırı, yakışıksız konuşur.
0	**1**	**2**	46.Başkalarınca kolay kızdırılır.	**0**	**1**	**2**	67.Okulda söz dinlemez, kurallara uymaz.
0	**1**	**2**	47.Terkedilip yalnız kaldığına dair kabus görür.	**0**	**1**	**2**	68.Akranlarının kendine yaklaşmasına izin vermez.
0	**1**	**2**	48.Gözdağı verir, tehdit eder.	**0**	**1**	**2**	69.Evden uzakta olmak onu korkutur.
0	**1**	**2**	49.Yeni tanıdığı yada iyi tanımadığı yetişkinlerin yanında çekingen davranır.	**0**	**1**	**2**	70.Çok konuşur.
0	**1**	**2**	50.Dikkatini yoğunlaştırmakta zorluk yaşar, dikkatini bir faaliyete uzun süre veremez.	**0**	**1**	**2**	71.Başka çocuklara vurur,tekme atar veya ısırır.
0	**1**	**2**	51.Sinirli ya da gergindir.	**0**	**1**	**2**	72.Tanımadığı kişilerden ürker,korkar.
0	**1**	**2**	52.Kızgın ve güceniktir.	**0**	**1**	**2**	73.Çok ağlar.
0	**1**	**2**	53. Akranlarından kaçınır.	**0**	**1**	**2**	74.Başkalarına acımasız davranır,kabadayılık eder beya kötülük eder.
0	**1**	**2**	54.Yakın olduğu kişilerden ayrılacağı zaman hasta olduğuna dair yakınır(ör:baş ağrısı,karın ağruısı vs).	**0**	**1**	**2**	75.Bir arkadaşı istediğini yapmazsa onu doğumgünü partisine davet etmeyeceğini söyler.
0	**1**	**2**	55.Kendi eşyalarına zarar verir.	**0**	**1**	**2**	76.Yalnızdır.
0	**1**	**2**	56.Kendini değersiz ya da işe yaramaz hisseder.	**0**	**1**	**2**	77.Her şeye burnunu sokar.
0	**1**	**2**	57.Bitmemiş bir etkinlikten diğerine geçer.	**0**	**1**	**2**	78.Pek çok kavdaya karışır.
0	**1**	**2**	58.Yakın olduğu birinden ayrılırken fazlasıyla üzülür.	**0**	**1**	**2**	79.Akranlarının birlikte yaptığı etkinliklerden uzak durur.
0	**1**	**2**	59.İntikamcıdır, öç alır.	**0**	**1**	**2**	80.Kavga sırasında silah yerine geçebilecek (makas,çatal vs) araçlar kullanır.
0	**1**	**2**	60.Mutsuz, zügün ya da depresiftir.	**0**	**1**	**2**	81.Sık sık gülmez ya da gülümsemez.
0	**1**	**2**	61.Başka çocukların veya ailenin diğer üyelerinin eşyalarına zarar verir.	**0**	**1**	**2**	82.Kendisiyle konuşulduğu zaman dinlemiyormuş gibi görünür.
0	**1**	**2**	62.Az hareketli, ağır hareket eden ya da enerjisi düşük bir çocuktur.	**0**	**1**	**2**	83.Bir çok şeyini kaybeder.
0	**1**	**2**	63.Bir çocuk istediğini yapmazsa, onu arkadaş grubundan dışlamakla tehdit eder.	**0**	**1**	**2**	84.Düşünmeden tehlikeli şeyler yapar.
0	**1**	**2**	64.Sessizce oyun oynamakta zorlanır.				

APPENDIX G – EMOTION REGULATION CHECKLIST

Aşağıdaki listede bir çocuğun duygusal durumu ile ilgili ifadeler yer almaktadır. Verilen numaralandırma sistemini göz önünde bulundurarak aşağıdaki davranışları çocukta ne kadar sıklıkla gözlemlediğinizi işaretleyiniz:

Bu davranışı:

(1) HİÇBİR ZAMAN/NADİREN, (2) BAZEN, (3) SIK SIK, (4) NERDEYSE HER ZAMAN gözlemliyorum.

	Hiçbir Zaman	**Bazen**	**Sık sık**	**Neredeyse Her zaman**
1. Neşeli bir çocuktur.	**1**	**2**	**3**	**4**
2. Duygu hali çok değişkendir (Çocuğun duygu durumunu tahmin etmek zordur çünkü neşeli ve mutluyken kolayca üzgünleşebilir).	**1**	**2**	**3**	**4**
3.Yetişkinlerin arkadaşça ya da sıradan (nötr) yaklaşımlarına olumlu karşılık verir.	**1**	**2**	**3**	**4**
4. Bir faaliyetten diğerine kolayca geçer; kızıp sinirlenmez, endişelenmez (kaygılanmaz), sıkıntı duymaz veya aşırı derecede	**1**	**2**	**3**	**4**
5. Üzüntüsünü veya sıkıntısını kolayca atlatabilir (örneğin, canını sıkan bir olay sonrasında uzun süre surat asmaz, endişeli veya üzgün durmaz).	**1**	**2**	**3**	**4**
6.Kolaylıkla hayal kırıklığına uğrayıp sinirlenir (huysuzlaşır, öfkelenir).	**1**	**2**	**3**	**4**
6. Kolaylıkla hayal kırıklığına uğrayıp sinirlenir (huysuzlaşır, öfkelenir).	**1**	**2**	**3**	**4**
7. Yaşıtlarının arkadaşça ya da sıradan (nötr) yaklaşımlarına olumlu karşılık verir	**1**	**2**	**3**	**4**
8. Öfke patlamalarına, huysuzluk nöbetlerine eğilimlidir.	**1**	**2**	**3**	**4**
9. Hoşuna giden bir şeye ulaşmak için bekleyebilir. (örneğin, şeker almak için sırasını beklemesi gerektiğinde keyfi kaçmaz veya heyecanını kontrol edebilir).	**1**	**2**	**3**	**4**
10. Başkalarının sıkıntı hissetmesinden keyif duyar (örneğin, biri incindiğinde veya ceza aldığında güler; başkalarıyla alay etmekten zevk alır).	**1**	**2**	**3**	**4**

	Hiçbir Zaman	Bazen	Sık sık	Neredeyse Her zaman
11. Heyecanını kontrol edebilir (örneğin, çok hareketli oyunlarda kontrolünü kaybetmez veya uygun olmayan ortamlarda aşırı derecede heyecanlanmaz).	**1**	**2**	**3**	**4**
12. Mızmızdır ve yetişkinlerin eteğinin dibinden ayrılmaz.	**1**	**2**	**3**	**4**
13. Ortalığı karıştırarak çevresine zarar verebilecek enerji patlamaları ve taşkınlıklara eğilimlidir.	**1**	**2**	**3**	**4**
14. Yetişkinlerin sınır koymalarına sinirlenir.	**1**	**2**	**3**	**4**
15. Üzüldüğünü, kızıp öfkelendiğini veya korktuğunu söyleyebilir.	**1**	**2**	**3**	**4**
16. Üzgün veya halsiz görünür.	**1**	**2**	**3**	**4**
17. Oyuna başkalarını katmaya çalışırken aşırı enerjik ve hareketlidir	**1**	**2**	**3**	**4**
18. Yüzü ifadesizdir; yüz ifadesinden duyguları anlaşılmaz.	**1**	**2**	**3**	**4**
19.Yaşıtlarının arkadaşça ya da sıradan (nötr) yaklaşımlarına olumsuz karşılık verir (örneğin kızgın bir ses tonuyla konuşabilir ya da ürkek davranabilir).	**1**	**2**	**3**	**4**
20. Düşünmeden, ani tepkiler verir.	**1**	**2**	**3**	**4**
21. Kendini başkalarının yerine koyarak onların duygularını anlar; başkaları üzgün ya da sıkıntılı olduğunda onlara ilgi gösterir.	**1**	**2**	**3**	**4**
22. Başkalarını rahatsız edecek veya etrafa zarar verebilecek kadar aşırı enerjik, hareketli davranır.	**1**	**2**	**3**	**4**
23. Yaşıtları ona saldırgan davranır ya da zorla işine karışırsa yerinde olumsuz gösterir (örneğin kızgınlık, korku, öfke, sıkıntı).	**1**	**2**	**3**	**4**
24. Oyuna başkalarını katmaya çalışırken olumsuz duygular gösterir (örneğin, aşırı heyecan, kızgınlık, üzüntü).	**1**	**2**	**3**	**4**