Psychodynamic Developmental Neuroscience
MSc Program
Poster Session

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Reflecting on Reflection:
An Attempt to Discern Specific Mechanisms of Representation in Substance Abusing Mothers

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Introduction

The capacity for mental representation is one of translation as much as it is one of acquisition and assimilation. Our mental life is curated and furnished with interpretations of experiences. Rene´ Magritte's *The Treachery of Images* is precisely this; the painting is of a pipe, but *it* is not a pipe. It is an image of a pipe. In the same way, the capacity for mental representation allows for an internalized version of an emotionally salient figure to become part of a person's mental life. This process, however, is not one of exact replication, but instead subject to the influences of environment, personality, past experiences, and even fantasy. This method of translation adds in the very human issues of intentionality, meaning, and motive to the behavior of others.

Representation will be considered through the lens of *mentalizing*, a process by which emotional states and affects are understood in the self as well as in another (Fonagy, Gergely, Jurist, & Target, 2005). This theory is operationalized and assessed by the Parent Developmental Interview (PDI) (Slade, Bernbach, Grienenberger, Wohlgemuth Levy, & Locker, 2004), a scored interview protocol. In particular, the validity and structure of the PDI will be explored to better understand the underlying constructs that make up the theory of mentalizing. This exploration will be anchored to a study of substance abusing mother's mental representations of their children, as well as observed care giving behavior. While their ways, means, and care giving is not necessarily the same, the mothers included are considered within the same category by the scoring system of the PDI.

The nature of the mother/child relationship and mothers' capacity for representation will be explored through both the considerations of attachment theory, and the contributions of psychoanalytic inquiry. Attention will also be paid to the implications and impact of substance abuse on the attachment system, from both the fields of neurobiology as well as empirical assessments of attachment. Narrowing the wide scope of psychoanalysis, this thesis will attempt to focus on a particular strand of psychoanalytic theory. While more theoretical work will be present as a foundation and counterpoint, emphasis will be given to psychoanalytic ideas that are framed within biology (Kandel, 1999, Solms & Trumbull, 2002) and scientific observation (Westen, 1998).

Method

The sample (n= 51) consisted of mothers enrolled in the Mothers and Toddlers Program (MTP). More than half of the mothers were receiving methadone maintenance treatment, while the others were enrolled in drug-free outpatient treatment. The ethnicity of the population predominantly identified as White, with the second largest group identifying as Black, and the third as Hispanic. Marital status indicated that most of the sample described themselves as never marrying, with cohabitation, marriage, and separated following in decreasing progression. Slightly more than half of the mothers described their living situation as independent, while the remainder described their situation as dependent, which included living with family, friends, or relatives as well as supervised settings. All subjects had at least one child; the mean age of the child was 17 months (*SD* = 13.64), and child gender was nearly equal.

Measurements

The Parent Development Interview (PDI): The Parent Development Interview is a structured interview protocol that asks caregivers to reflect on their own feelings and the feelings of their children in a variety of contexts. Responses to the interview are used to produce a score of *reflective functioning*, which is an empirically derived depiction of mentalizing. Scores range from -1 (anti-reflective) to 9 (nuanced and highly articulate mentalising). Use of the terms mentalising or reflective functioning within the PDI manual, as well as Fonagy's work, is used interchangeably (Slade et al, 2004, p. 3; Fonagy, 2001, p. 165; Fonagy, Steele, Steele, & Target, 1998).

The PDI is designed to "assess the quality of a parent's representation of his/her relationship with his/her child. It is a semi-structured clinical interview that… probes a variety of aspects of the parent's, typically the mother's, view of herself and her child and themselves (Slade et al., 2004, p. 2)." Endorsements of binary codes, henceforth referred to as *microcodes*, on the PDI (by an independent clinician) determine the level of reflective functioning the subject possesses, as well as the particular mental activity observed. Overall item reliability was good (.63 interclass correlations (Suchman et al., 2008, p. 508) on sample protocols with trainer).

The NCAST Teaching Scales (NCAST): The NCAST is typically used to assess observed maternal care with the child present (Barnard & Eyres, 1979). It is a structured, standardized measure that contains subscales that are totaled to produce scores for both mother and child. The maternal subscales assess sensitivity to cues (with response to distress on its own subscale), growth fostering (social, emotional and cognitive), as well as safe positioning of the child, attentiveness to the child's interest, and their general interactions. The child subscales assess the clarity of maternal cues, and responsiveness to the caregiver, as well as the child's engagement with the mother. A score on one of the subscales that is one standard deviation from the mean (contingent upon educational background) is considered a viable indicator of disruption in maternal care (Suchman et al., 2010).

Initial Loadings

Initial Factor Analysis

Variable	Components					
	1	2	3	4	5	6
BEH	.813	-.280	-.117	-.279	-.076	.246
BEHS	.767	-.290	-.106	-.261	-.109	.178
B5a	-.720	-.246	-.227	-.133	.146	.128
BEHC	.639	-.190	-.177	-.348	-.056	.021
B5b	-.518	-.065	.361	-.291	-.436	.084
B5c2	-.418	-.317	.382	.273	-.222	.149
NAIV	-.071	.956	-.072	.023	-.067	-.074
NAIVS	-.174	.900	-.103	.154	.014	.010
NAIVC	.004	.793	.068	-.079	-.035	.137
C2	-.065	-.008	.969	.027	.025	-.033
C2C	-.046	-.043	.954	.062	.061	-.012
A1	-.092	.049	.105	.735	-.230	.014
B5d	-.167	-.010	-.022	.704	.112	-.011
B5g	.020	-.055	.311	.004	.793	.057
C5	-.272	-.035	-.185	-.128	.739	.058
PACKN	.299	-.071	.017	-.082	.005	.738
DISAV	.347	-.362	.057	-.166	-.161	-.657

Initial Data Reduction

Data analysis began with steps to reduce the large amount of data into a more manageable format. Focusing on the data at the initial assessment, ten narratives that focused particularly on Mother/Child interactions were selected for inclusion. Within these narratives, 134 possible microcodes could be potentially endorsed. This includes a general endorsement of a code, self-focused endorsement, and child focused endorsement. For example, an unspecified depiction of behavior would pick up the general code (BEH), but if within the same narrative the child's behavior was conveyed, the self permutation would also be scored (BEHS). Of the 134 codes, 40 were endorsed at least once across all ten narratives: items that were never endorsed were eliminated from further analysis. The remaining microcodes and their corresponding hierarchy in the PDI, are shown in the center table

Abstract

Reflective functioning (RF) involves empathy, appraisal, (an understanding of) intentionality, the ability to make developmentally appropriate attributions, causality, and a series of intrapersonal mechanisms. Factor analyses were performed on the Parent Development Interview (Slade et al, 2004) to isolate configurations of component codes in an empirical measurement of mentalizing. These analyses demonstrated four distinct factors that suggest differential mechanisms within the overarching theory of RF. One factor indicated a lack of reflection, and was negatively correlated with observed parenting measures focused on dyadic interaction, while two other factors had correlations approaching significance. This suggests that reflective functioning may be a series of components rather than a global attribution.

Included Codes

Included Microcodes* from the PDI

Microcode	Abbreviation	RF Score	Description
Naïve or Simplistic	NAIV	3	Reduced and clichéd depictions of mental states
Impact of Mental States on Others	B5c2	4	Child mental state impacts child behavior
Impact of Mental States on Others	B5a	4	Self mental state impacts self behavior
Behavioral-Focused	BEH	2	Unelaborated descriptions of behavior
Successful Disavowal	DISAV	1	Passive and evasive, but not outwardly hostile, response to questions
Impact of Mental States on Others	B5d	4	Child mental state impacts child mental state
Impact of Mental States on Others	B5b	4	Self mental state impacts self mental state
Developmental Perspective	C2	4	Awareness of age appropriate developmental changes
Impact of Mental States on Others	B5g	4	Self mental state impacts child mental state
Opacity	A1	4	Understanding that mental states are not always observable, and may require speculation
Transactional Processes	C5	4	An acknowledgement that mental states affect both members of the dyad
Passive Acknowledgement Of Mental States	PACKN	1	Suggests the understanding that mental states exist, but unelaborated
Impact of Mental States on Others	B5h	4	Child mental state impacts self mental state
Impact of Mental States on Others	B5f	4	Self mental state impacts child behavior
Impact of Mental States on Others	B5e	4	Child mental state impacts self behavior
Personality-Focused	PERS	2	Unelaborated descriptions of personality
Impact of Mental States on Others	B5	4	Understanding that mental states, of both the self and other, can have an impact on the mental state or behavior on either member of the dyad
Diverse Perspectives	B3	4	Understanding that parent and child may see a situation differently
Overly Analytical	VGANL	2	Elaboration without signs of understanding
Feelings Unrelated	B2	4	Explicit understanding that there are viable limitations that observable behaviors can provide to underlying affects
Accurate Attribution	B1	4	Indicates a plausible description of behavior related to a particular mental state
Changes in Mental State	C4	4	Implies the understanding of changes of mental states over time: between past and present, and present and future
Disguise	A2	4	Understanding that mental states are able to be disguised
Intergenerational Perspective	C1	4	Suggests the parent is able to think about the mental state of the child, accurate to their developmental level
Overly Analytical	QUANL	3	Elaboration without signs of understanding

*Codes listed may also have a self (S) and child (C) focused permutation. Endorsement is indicated within the component analysis.

Final Components

Final 4 Factor Solution

Variable	Component			
	1	2	3	4
BEH	.927			
BEHS	.870			
BEHC	.752			
B5d	-.490			
PACKN	.436			
NAIV		.944		
NAIVS		.884		
NAIVC		.837		
C2			.978	
C2C			.976	
C5				.846
B5g				.775

Rotation Method: Varimax with Kaiser Normalization.

The table shows the final factor analysis that was run on the binary microcodes in the PDI that were endorsed by at least 10% of the population (≥ 5 participants). This eliminated a large number of the microcodes that were endorsed infrequently across the ten narratives selected (for the full range of endorsed codes, see Appendix A). The analysis maintained a sufficient level of sampling adequacy (.605) using the Kaiser-Meyer-Olkin Measure.

Results

A series of negatively valenced significant correlations are demonstrated between factor one and growth fostering, contingent items, as well as the overall mother score, $p < .05$.

NCAST Maternal Scales x Factors

Components	SC	RD	SEGF	CGF	CIO	MST
Factor One	-.221	.143	-.333*	-.307*	-.357*	-.320*
Factor Two	.052	.023	.134	.083	.187	.120
Factor Three	.052	.021	.149	.226	.138	.197
Factor Four	.078	-.218	-.105	.163	-.023	-.053

*Significant at the .05 level (2 –tailed)
SC= Sensitivity to Cues; RD= Response to Distress; SEGF= Social Emotional Growth Fostering; CGF= Cognitive Growth Fostering; CIO= Contingent Items Only; MST= Maternal Scales Total

Applying the same method to the scales assessing the child, the table below shows a similar trend of negatively valenced significant correlations between factor one and response to cues and contingent scale items, as well as overall child score ($p < .05$).

NCAST Child Scales x Factors

Components	CC	RC	CIO	CST
Factor One	-.248	-.278*	-.278*	-.292*
Factor Two	-.017	-.107	-.107	-.082
Factor Three	.170	.059	.059	.108
Factor Four	-.021	-.021	-.021	-.023

*Significant at the .05 level (2 –tailed)
CC= Clarity of Cues; RC= Response to Cues; CIO= Contingent Items Only; CST= Child Scales Total

Discussion

The Four Factors

Factor one is characterized by behavioral depictions of the self and child, with only passive acknowledgement of mental states, and poverty in understanding the impact those states may have. *Factor two* is characterized as a naive and simplistic depiction of the self and child, sounding more like a global attribution than a well considered and insightful description. *Factor three* is characterized as an appropriate understanding of the self and child's perspective, with the child's development and age appropriate capacities taken into account. *Factor four* is characterized as an understanding of the transactional nature of social interaction, and how the parent's mental state can affect the child.

Hypothesis 1

It was hypothesized that reflective functioning was made up of a series of mechanisms rather than being one bifurcated construct of reflective or antireflective. The mechanisms that emerged through the final factor analysis do not significantly correlate with one another, save factors two and four which is negative, $p < .01$. This is consistent with the conceptual framework of the two factors, as mothers who demonstrate an understanding of the impact of mental states and the bidirectional nature of relationships would be less likely to make naïve and global attributions.

Hypothesis 2

It was also hypothesized that the microcode clusters would not be bound by the score bracket present within the PDI. This hypothesis was not demonstrated in three of the factors, as the codes grouped together based upon their existing score within the measurement. Factor one, however, was made up of microcodes suggesting scores of 1(absence of mental states), 2 (vague and unclear mental states), and 4 (rudimentary connection between actions and mental states).

Hypothesis 3

As a final hypothesis, it was believed that microcodes that suggest higher mentalization/reflection within the sample should correlate with measures of beneficial parenting. The NCAST measures of growth fostering, timely responses to cues from their child, and parenting overall was negatively correlated with Factor one, a cluster of codes that indicate poverty or absence of the ability to attribute emotional intention and meaning to the self and others, $p < .05$. This is synchronous with the prediction that there would be an expressed correlation between parenting that attempts to foster social, emotional and cognitive growth while being responsive to the child's cues. This relationship may have appeared more clearly in a larger sample or a different population that was more normally distributed.

Limitations

The largest limitation of the analysis was the number of factors as compared to the number of subjects. Even with the reduced number of microcodes, 12 codes by 51 participants diminish both the statistical power of the sample, as well as effect size. The correlation of factors by NCAST subscales was approaching significance for factors three and four, but the rarity of those constellations within a group of 51 cannot accurately indicate a significant finding. Another limitation was the nature of the population: substance abusing women with young children who are making some attempt at recovery. Within this study, these women had no corresponding control group matched for demographics, which impacts the external validity of the study. The PDI also introduced a limitation, due to its binary endorsement structure, rather than scaled assessments of each of these codes. This limitation and consideration, while something to consider in the designing of a measurement, is likely compounded because of the small sample. However, using the PDI in conjunction with another assessment of representations that *is* scaled may be able to provide a more full characterization of congruent mechanisms .There were also significant limitations within the neurobiological portion of the study. No form of imaging technique was used, nor measurement of neurotransmitters taken. In this way, neuroscience can only offer a theoretical contribution, and in many ways it is largely speculative. It is difficult to produce a mentalizing narrative for a stranger's child to expand upon Nitschke and colleagues (2004) findings without it becoming a projective test.

Brain Mechanisms for Processing Social Exclusion and Rule Violation in Children with Autism Spectrum Disorder

The Bridge Programme
A partnership of the Anna Freud Centre, UCL, and Yale School of Medicine

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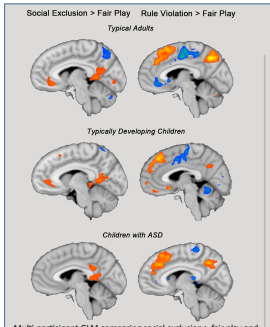
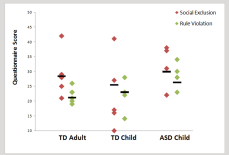
Introduction

Ostracism is a social phenomenon that threatens interpersonal relationships, the importance of which are strongly emphasized in psychoanalytic theory. Social exclusion inherently involves an element of expectancy violation, in that we expect other people to include us in social interactions. An interactive ball toss game (Cyberball) has been used in fMRI studies to investigate the brain response to social exclusion (Eisenberger et al., 2003; Masten et al., 2009; Onoda et al., 2009). Here, Cyberball was compared to a new ball tossing game, "Cybershape", in which the shape of the ball specifies the player to whom it should be thrown. In Cybershape, one of the players breaks the rule, eliciting a non-exclusive expectancy violation. Contrasting activation to rule violation and social exclusion allows for the dissociation of neural correlates of exclusion versus expectancy violation. We explored differences in the experience of social exclusion and rule violation in children with ASD, a disorder characterized by social deficits as well as sensitivities to rules. This allowed us to hypothesize about differences in the experience of social exclusion in ASD.

Results



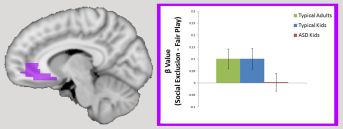
Multi-participant GLM comparing social exclusion > fair play and rule violation > fair play in 3 participant groups (Cyberball: q < .05, k = 4 Cybershape: q < .001, k = 10)



Self-reported distress scores following Cyberball and Cybershape in 3 participant groups

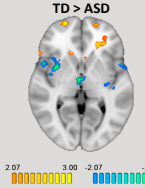
Cyberball

Between group comparison of brain activation to social exclusion > fair play in children with and without ASD (whole brain voxel-wise independent samples t-test, $p < .05$, k = 10)

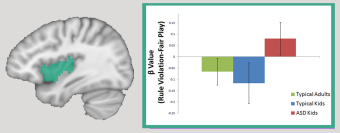


Structural ROI analysis comparing average activation in the vACC in Cyberball (social exclusion > fair play) in typical adults, TD children, and children with ASD

Cybershape

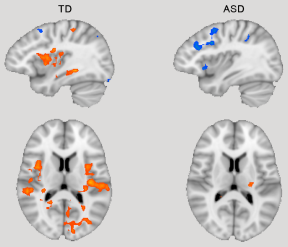


Between group comparison of brain activation to rule violation > fair play in children with and without ASD (whole brain voxel-wise independent samples t-test, $p < .05$, k = 10)



Structural ROI analysis comparing average activation in the vACC in Cybershape (rule violation > fair play) in typical adults, TD children, and children with ASD

Cyberball vs Cybershape



Social Exclusion - Fair Play > Rule Violation - Fair Play

Between game comparison of differential activation in Cyberball and Cybershape in TD children and children with ASD (whole brain voxel-wise independent samples t-test comparing social exclusion – fair play and rule violation –fair play, $p < .01$, k = 4)

Methods

Whole-brain scanning (TR = 2s) was performed on a 3-Tesla MRI scanner.

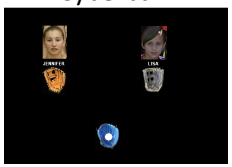
Cyberball:
23 adults(11 male, mean age 24.0 years ± 3.81)
11 TD children (7 male, mean age = 13.61± 2.67)
9 children with ASD (5 male, mean age = 13.51± 4.13)

Cybershape:
23 adults (11 male, mean age 24.04 ± 3.77)
12 TD children (8 male, mean age = 12.90 ± 2.51)
12 children with ASD (9 male, mean age = 13.66 ± 3.43)

Subject Group		ADOS (module 3)	Average IQ (DAS)
ASD			
PDD-NOS	2	**11.9** n = 10	**103.5** n = 11
Asperger's	6		
Autism	4		
Currently Undiagnosed by Yale	1		
Control			
Typically Developing	12	n/a	**105.1** n = 12

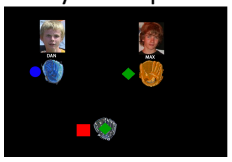
Participants played Cyberball for 5 minutes, with 10 alternating blocks of fair play and exclusion. Each block was 12 throws which were completed in 30 seconds. In fair play, participants received the ball on 1/3 of the throws; in exclusion, participants never received the ball.

Cyberball



Participants played Cybershape in 10 alternating blocks of fair play (rule consistent) and rule violation. In fair play, participants received the shape 1/3 of the time, and the shape rule was never broken. In rule violation, participants received the shape one-third of the time, but one of the virtual players consistently violated the shape rule.

Cybershape



After each game, participants were asked to rate 10 statements judging their social distress in response to rule violation or social exclusion.

Conclusions

We demonstrated a functional dissociation in the neural responses to social exclusion and rule violation in typical adults. Contrasting social exclusion and rule violation in children with and without ASD revealed differences in the neural processing of both in children with ASD.

Self reported distress following social exclusion did not differ between participant groups, but distress following rule violation was greater in children with ASD compared to typical adults and children.

Region of interest analyses revealed meaningful differences between participant groups. During social exclusion, typical adults and children had significant activation in the vACC, while children with ASD did not. During rule violation, typical adults and children showed decreased activation in the right insula, while children with ASD showed significantly increased activation in this region.

The contrast of brain activation to social exclusion and rule violation revealed that children with ASD process social exclusion in a way that is more similar to the processing of rule violation.

While children with and without ASD are equally distressed by social exclusion, children with ASD are disproportionately distressed by the expectancy violation inherent in exclusion.

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Motherhood as a developmental experience: A neuropsychoanalytic investigation of the role played by maternal status on affect regulation.

Student: *Domenico Scaringi* Supervisors: *Dr. Helena Rutherford and Dr. Lawrence Levenson*

Introduction

-**Motherhood**: Given the long period of dependency of human's offspring, precise parenting abilities are certainly of primary importance for maintenance of life. In order to provide effective caregiving, a mother has to undergo both physiological changes and psychological adjustments.
It is essential for a mother to understand emotions (both her own and her child's), and provide an adequate response to her baby's needs. Therefore, emotion regulation is certainly one of the behaviours a mother has to further specialize, develop, and adapt in order to provide effective parenting.

-**Psychoanalysis**: Motherhood is a developmental phase characterised by intrapsychic changes. According to Winnicott (1956), *primary maternal preoccupation* is the mental state that allows the mother to almost completely focus on the person of her baby, and to constantly try to take care of him. It is the mother's mirroring behaviour that allows the differentiation of mental states and the establishment of the baby's Ego.

-**Neuroscience**: Several studies of functional neuroimaging have used the presentation of infant stimuli (facial expressions, vocalizations) in order to investigate the characteristic neural correlates of normal parenting. There are many forms of evidence suggesting significant differences in parental responses to infant stimuli.

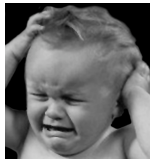
-**Using the Event Related Potential (ERP) technique to investigate emotion regulation:** The late positive potential (LPP) is an ERP component responsive to the emotional content of both positive and negative valenced images. The importance of processing these images is motivationally relevant, especially if the content is appetitive or aversive, and thus the LPP has been defined as an index of attentional allocation. The LPP is modulated by the intensity or arousing content of the emotional valence of the stimulus (more arousing, greater LPP amplitude). Lastly, it has been show that LPP can be modulated by conscious cognitive control: specifically, instructions to increase or decrease one's emotional response to an emotional picture modulate the amplitude of the LPP. **In this study, the LPP was therefore used as a neural marker of emotion regulation.**

-**Approach**: The LPP was compared in mothers and non-mothers while they viewed and regulated their emotional response to photographs of infant faces that varied in emotional expression (pleasure, distress, and comfort/neutral).

Methods

-**Participants**: 12 mothers and 10 non-mothers were recruited from Yale University and the New Haven community. Mothers had children under the age of five; non-mothers did not have children, step-children, or young nieces, nephews, and cousins.
-Stimuli: 75 gray scale digital photographs of babies, provided by Alice Proverbio. Pictures were all controlled for luminance; they consisted of babies displaying distress (25), pleasure (25) or comfort (25).

-**Procedure**: EEG was continuously sampled during the task at 250 Hz, with Cz reference, from a 128 channel dense array set-up (Electrical Geodesics, Inc.). ERPs were segmented with 100 ms baseline until 900 ms post-stimulus onset. The stimuli were presented through E-prime computer software while the brain electrical activity was recorded via NetStation**.**



-**Procedure**: EEG was continuously sampled during the task at 250 Hz, with Cz reference, from a 128 channel dense array set-up (Electrical Geodesics, Inc.). ERPs were segmented with 100 ms baseline until 900 ms post-stimulus onset. The stimuli were presented through E-prime computer software while the brain electrical activity was recorded via NetStation**.**
The study consisted of two experimental components and one practice component. Throughout, in all the trials images were randomly presented for 1500ms, with an inter-stimulus interval between 500-700ms. The first block of the experiment consisted of a passive viewing task. Participants were randomly presented with all the infant images and asked to passively view them. The second block was the emotion regulation task. Participants first practiced regulating their emotional response while viewing photographs of two distressed infants and two happy infants presented one at a time. Participants were asked to think how they would increase and decrease their response to each image, and then discuss with the experimenter. This was then followed by the emotion regulation task that was composed of four blocks: increase to distress, decrease to distress, increase to pleasure, and decrease to pleasure. Each block was counterbalanced among participants, had constant valence and contained 25 randomly presented images. Detailed standardized instructions were provided before the experiment where the participants were asked to either decrease or increase their emotional response.

Instructions Example

Decreasing emotional response to photographs of distressed infants
During this part, you will see only pictures of upset infants that may make you feel negative emotions like sad, upset, afraid, or angry. Your task is to decrease the emotion the pictures make you feel.

Imagine how a doctor deals with seeing an upset baby in an emergency room. The doctor needs to stay focused to do his job. In the same way we want you to hold back or reduce any negative emotion you feel while still looking at the picture. But we don't want you to replace your emotion with a different one. In the emergency room example, the doctor wouldn't try to feel a different emotion (such as finding humour) when they see a baby who is upset. Instead *they try to decrease the reaction that they have*.
The word **DECREASE** will be presented on the screen before each picture to remind you what to do – to get ready to hold back and decrease your emotion - whatever negative emotion you might feel.

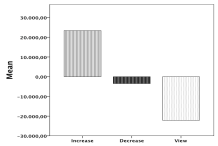
Results

Repeated measures analysis of variance (ANOVA) was performed. The ANOVA had 3 within-subject factors: Hemisphere (Left vs Right), the emotional Valence (Positive vs Negative), and the Condition (Increase, Decrease, View). The group (moms vs non-moms) was the between-Subject factor.

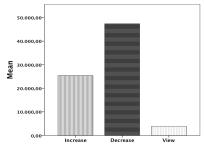
All Participants

Although there was no significant difference in ERPs between the two groups, importantly, there was a Regulation Condition by Group interaction $F(2, 40)= 9.59$, $p< .001$. This suggests a difference in the two groups in the ability to regulate emotions and therefore analysis focused on mothers separate from non-mothers.

Positive valence



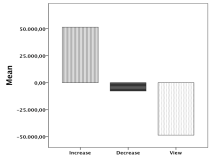
Negative valence



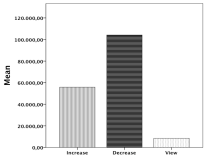
Non Mothers

There was a main effect of Regulation Condition $F(2, 18)= 7.92$, $p= .003$, as well as a main effect of Infant Expression $F(1, 9)= 12.58$, $p= .006$. The Regulation Condition by Infant Expression interaction was significant $F(2, 18)= 3.77$, $p= .043$. Post-hoc t-tests showed differences between the baseline and regulation task.

Positive valence



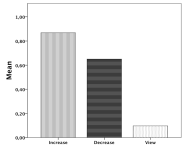
Negative valence



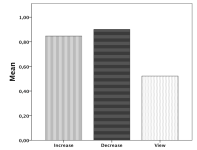
Mothers

There was no significant effect of Regulation Condition $F(2, 22)= 2.75$, $p= .086$ or Infant Expression $F(1, 11)= 2.33$, $p= .155$. There was also no Regulation Condition by Infant Expression interaction $F(2,22)=.58$, $p=.57$. Post-hoc t-tests showed no difference between baseline and the conditions in the emotion regulation task

Positive valence



Negative valence



Discussion

Maternal status has a significant effect in the abitlity to regulate emotion.The results suggest an automatic propensity in regulating one's own emotional response in mothers. Therefore, it is arguable that the experience of being a mother induces permanent changes.

This finding is in agreement with Winnicott's idea that being a parent requires focusing and understanding of the needs of the one's own baby. In fact, the parent has to be attuned with the emotional state of the baby, and, in this context, the ability to regulate emotions is essential in order to contain the baby's state, and deliver an appropriate parenting response.

Follow up studies are needed to further understand the neural correlates of *primary maternal preoccupation* and parenting. In fact, the transition to parenthood is affected by several factors, such as genetic endowment, social environment, and the early experience of being cared for as a child. For example, it would be helpful to study the role played by attachment on affect regulation abilty. Moreover, there are many different forms of "parenting" that would require investigation (e.g.: adoption, foster care, step-parenting, grand parenting and teaching). Neuroimaging may also help to detect dysfunctional response in at-risk populations (e.g.: drug addicted mothers). In fact, the neuroscietific investigation of *primary maternal preoccupation* may be useful to inform clinical practice and develop and evaluate future intervention programs in high-risk expectant parents.

Acknowledgments

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Risk-Taking Behavior in Adolescence: The Influence of Peers

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Introduction

Adolescence: transitional period marking the second decade of life, which bridges childhood and adulthood. Disciplines, such as **Developmental Psychology**, **Psychoanalysis** and **Neuroscience** have contributed to the study of this phase of development.

Adolescence and Risk-Taking Behavior: object of recent scientific investigation. Defined as "engagement in behaviors that are associated with the probability of undesirable results" (Boyer, 2006, p. 291).

While a modest amount of risk-taking behavior indicate *healthy developmental experimentation,* researchers' focus has been *on developmentally maladaptive and self-damaging risk.* **Examples of high risky behaviors**: tobacco use, reckless driving, unprotected sexual activity, and delinquency.

1) Adolescents engage in more risky behaviors than adults (Furby & Beyth-Maron, 1998).

2) Adolescents, as opposed to adults, are more susceptible to the influence exerted by peers (Gardner & Steinberg, 2005).

3) Smokers, as opposed to non-smokers, are more likely to be influenced by peers' opinion (Ali & Dwyer, 2009).

Adolescence and Risk-Taking: Psychosocial Theories
a) Cognitive Factors
b) Emotional Factors
c) Socio-Cultural Factors
d) Psychological Approaches to Peer Influence

Adolescence and Risk-Taking: Psychoanalytic Theories
a) The Biphasic Nature of Sexuality (Freud, 1905; Freud, A., 1958).
b) Adolescence as a Second Individuation Process (Blos, 1967).
c) The Function of Peers in Adolescence (Van Dam, 1991).

Adolescence and Risk-Taking: Neurobiological Correlates
a) Adolescent Brain Structure.
b) Adolescent Brain Neurotransmitter Systems.
c) Neurobiological Correlates and Peer Influence.

Hypotheses

The present study had 2 aims:
1) Empirically investigated if peer influences affected risk-taking behavior among adolescents.
2) Examined if adolescents, who engaged in a specific type of risky behavior, which is cigarette. smoking, were more susceptible to peer pressure

Two a-priori hypotheses were put forth:
1) Adolescents were more likely to engage in risk taking behavior, when faced with peer pressure.
2) Smokers, when compared to non-smokers were more likely to be affected by peers' opinion, in the context of risk-taking behavior.

Two exploratory hypotheses:
1) A positive correlation was hypothesized between risk-taking behavior, as mediated by peer pressure and impulsiveness, as measured by the Barratt Impulsiveness Scale
2) A negative correlation was hypothesized by risk-taking behavior as mediated by peer pressure and resistance to peer influence.

Method

Participants:

Sample Characteristics (N=39)

Mean± SD	Non-smokers (n=17)	Smokers (N=22)
Age	16.18± 1.70	16.23 ± 1.41
Gender	11Female/ 6 Male	8 Female/ 14 male
Ethnicity	14 White/ 3 Black	21 White/ 1 Asian
School Grade	6 Ninth-Grade 1 Tenth-Grade 3 Eleventh Grade 7 Twelfth Grade	5 Ninth-Grade 4 Tenth-Grade 7 Eleventh Grade 6 Twelfth Grade
*Cigarettes a day		15.14± 4.86
*Cotinine levels		1132.23 ± 777.65 ng/ml
*Years smoked		2.74 ± 1.79 years
mFTQ		0.80± 0.26

Procedures: Adolescents were recruited into the study by the main Research Coordinator. The recruiting procedure consisted in going into CT schools, were smokers were encouraged to sign up for a smoking treatment program funded by the NIH. At the same time, the current research study was presented and nonsmokers, were also encouraged to sign up for the study. Adolescents were then contacted by phone and given further information about the study.

Measures

a) Demographic Information Form.
b) Modified Fagerstrom Tolerance Questionnaire (mFTQ).
e) Smoking History Questionnaire.
d) Balloon Analogue Risk-Task (BART) (Lejuez, et all., 2002).
e) Peer Pressure Balloon Analogue Risk-Task.
f) Barratt Impulsiveness Scale (Patton, et al. 1995).
g) Resistance to Peer Influence Scale (Steinberg & Monahan, 1997).

Peer Pressure Balloon Analogue Risk Task (BART)

The Peer Pressure BART is a behavioral paradigm recently developed to measure susceptibility to peer pressure in the context of risk-taking behavior, and if any, its degree and direction. The peer pressure component is the new factor added to this instrument. Participants are told that while playing with the BART, there will be another adolescent online watching them while they play. Participants are told that the adolescent has played the game before and he/she will send him/her suggestions such as "pump more" "pump less" just right".

Results

Table 1.

Differences Between Regular and Peer Pressure BART in the Whole Sample (N=39)

	Regular BART		Peer BART			
	M	SD	M	SD	t	p
Explosions	9.97	4.28	11.38	4.06	-2.08	.008
Pumps AdjAVg	37.51	15.08	40.64	15.65	-1.72	.094

Table 2.

Differences Between Regular and Peer BART Between Smokers and Non-Smokers

		df	F	p
Outcome Explosions	Between groups	1	4.135	.049
	Within groups	37		
Outocome PumpsAdjAvg	between groups	1	1.903	.176
	Within groups	37		

Results

Table 5.

Correlations Between Impulsivity and Risk-Taking Measures

Measure	Outcome Explosions	Outcome PumpsAdjAvg
BIS Total	.446*	.185
BIS Nonplanning Total	.345*	.133
BIS Motor Total	.285	.171
BIS Cognitive Total	.496**	.226

Note. $^{*}p < 0.05$, $^{**}p < 0.01$

Discussion

• This study provides strong empirical evidence for the role played by peers in adolescents' engagement in risk-taking behavior.
•It confirms the hypothesis that smokers, when compared to nonsmokers are more susceptible to the influence of peers in the context of risk-taking behavior.
•The correlation found between impulsivity and increased engagement in risk-taking behavior validates the key role played by an individual's capacity for emotion regulation in one's susceptibility to engage in risky behaviors.
•More research to investigate this and other mediating factors.
•Findings have to be interpreted through a **combination of psychological, neurobiological and psychoanalytic approaches.**
•**Integration** is essential for the development of more **eclectic treatment interventions**.
•Neuroimaging studies provide biological explanations for adolescents' engagement in risk-taking behavior.
•Psychoanalytic theories are essential to understand the influential role of peers.
•Development of treatment interventions targeting peers.
•Neuroimaging studies provide useful information about the neural correlates of this phenomenon, but **psychoanalysis** is necessary to comprehend its **etiology** and to understand the **individual reasons** as to why some adolescents start smoking, while others do not.

This study was funded by the NIH Grant: P50DA009241.
Contact: Eleonora.Cavalca@gmail.com

Narcissistic Personality Traits Modulate Face Processing Between Self and Other

By Emily M. Kilroy

Research Advisor: Dr. James C. McPartland
Psychoanalytic Advisor: Dr. Nancy Olsen

Introduction

HUMAN FACE PERCEPTION is critical for interpersonal interactions.
- Face perception is reflected neurally by the face-sensitive N170 event-related potential (ERP).
- The magnitude in which a face elicits a response is reflected in enhanced amplitude and shorter latency.

SOCIAL CHARACTERISTICS modulate N170 amplitude and latency
- Individuals with social disorders produce atypical N170 ERPs.
- The N170 ERP can also be modulated by different identities and expressions of face stimuli.

NARCISSISTIC PERSONALITY DISORDER (NPD) is characterized by grandiose traits, diminished empathy and disinterest in others.
- NPD individuals have an altered (conscious and/or unconscious) perception of themselves and of others (Kohut, 1977).
- Narcissistic traits facilitate social manipulation as a self-enhancing strategy and defend against a vulnerable self-concept (Morf and Rhodewalt, 2001).
  - -Grandiose traits include: exaggerated self-importance, exploitativeness, and superiority.
  - -Vulnerable traits include: covert presentation, shame, and low self-esteem.

Aims

1. Explore how narcissistic traits modulate N170 **amplitude** when viewing neutral and fearful expressions of self and other face stimuli.

2. Explore how narcissistic traits modulate N170 **latency** when viewing neutral and fearful expressions of self and other face stimuli.

3. Investigate the relationship between narcissistic and empathic traits in the general population.

Methods

PARTICIPANTS
31 typically developing individuals, age ranging from 18 to 32 years (M = 24, SD = 3.59) were screened for the study. Participants were sorted into High and Low narcissistic trait groups based on a published mean score of the Narcissism Personality Inventory (NPI) (M = 16) (Wallace et al., 2002). Those scoring below 16 were considered **Low-NPI** and those scoring above were considered **High-NPI**. The Low-NPI group included 19 participants (16 female, 3 male), the High-NPI group included 12 participants (7 female, 5 male). In this sample, mean NPI = 13.4, minimum score = 3, maximum score = 35, SD = 7.02.

STIMULI
Black and white digital portraits of each participant were used as face stimuli. Fear and Neutral expressions were standardized for mean luminance. Target stimuli consisted of both neutral and fear faces altered with a mosaic filter in Photoshop CS3 (texture size 17, grout size 12). Stimuli were presented 14.11 x 14.11 cm frames on a PC computer.

MEASURES
NPI: a 40-item forced choice questionnaire assessing subclinical levels of grandiose narcissistic traits. Subscales: Authority, Self-sufficiency, Superiority, Exhibitionism, Exploitativeness, Vanity, Entitlement.

Empathy Quotient (EQ): a 50-item survey where statements are rated on a 4-point Likert scale with “definitely agree,” “slightly agree,” “slightly disagree,” and “definitely disagree” answer options. Subscales: Cognitive Empathy, Emotional Reactivity, and Social Skills.

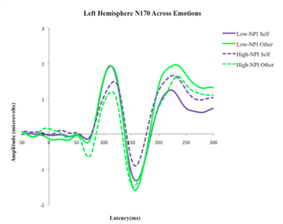
Interpersonal Reactivity Index (IRI): 28-item survey consisting of four separate scales related to empathy: Fantasy identification, perspective taking, Empathic Concern, and Personal Distress.

DESIGN
Face stimuli were presented in three blocks: block 1: 50 self-neutral faces, 50 self-fear faces, 10 target faces; block 2: 50 neutral-self faces, 50 neutral-other faces, 10 target faces; and block 3: 50 fear-self faces, 50 fear-other faces, 10 target faces.

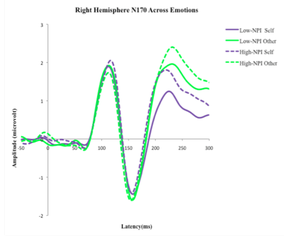
DATA PROCESSING AND ANALYSIS
- ERP recorded continuously at 250 Hz using EGI 128-channel sensor nets.
- Electrodes, Left: 58,59,64,65,69,70; Right: 90,91,92, 95,96,97, were averaged and windowed from 139 to 191 milliseconds.
- Repeated measures analysis of variance (ANOVA) was performed
  - -Within-subject factors: hemisphere (left, right), identification (self, other), and emotion (neutral, fear)
  - -Between subject factors: Low-NPI and High-NPI groups.

N170 Results

N170 amplitude and latency significantly differed between groups in the left hemisphere across emotion



Left hemisphere: mean N170 for self-face and other-face stimuli across emotion for Low- and High-NPI groups.



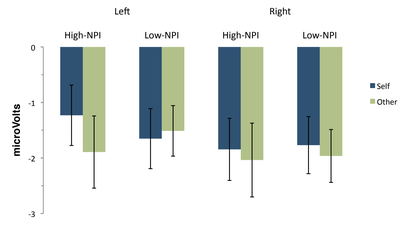
Right hemisphere: mean N170 for self-face and other-face stimuli across emotion for Low- and High-NPI groups.

Amplitude

In the left hemisphere, the Low-NPI group displayed similar N170 amplitude when perceiving self- and other-face stimuli while the High-NPI group showed enhanced amplitude to other

Interactions
- Repeated measures ANOVA revealed a significant interaction effect between group x hemisphere x identity
  F(1,30) = 8.509, p = .007
- Low-NPI Group
  LH: Self: M = -1.65 mV, SD = 2.36; Other: M = -1.51 mV, SD = 1.98
- High-NPI Group
  LH: Self: M = = -1.23 mV, SD = 1.88; Other: M = -1.89 mV, SD = 2.25

N170 Amplitude Across Emotion



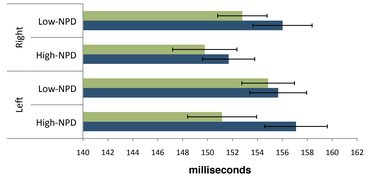
Latency

In the left hemisphere, the Low-NPI group displayed similar N170 latencies when viewing self- and other-face stimuli while the High-NPI group showed a shorter latency for other

Main Effects
- Emotion: F(1,30) = 10.305, p = 003.
  Neutral: M = 152.7 ms, SD = 8.47; Fearful: M = 154.6 ms, SD = 7.75
- Identiy: F(1,30) = 4.29, p = .047
  Self: M = 155.1 ms, SD = 8.49; Other: M = 152.2 ms, SD = 7.75

Interactions
- Repeated measures ANOVA revealed a significant interaction effect between group x identification x hemisphere
  F (1,30) = 7.58, p = .010
- Post hoc test revealed LH differences in the High-NPI group
  LH at t(18) = 5.16, p = .023
- Low-NPI Group
  LH: Self: 155.7 ms, SD = 9.94; Other: 154.9 ms, SD = 9.21
- High-NPI Group
  LH: Self: 157.1 ms, SD =8.70; Other: 151.2 ms, SD = 9.59

N170 Latency Across Emotion



NPI and Empathy Results

Correlations

Pearson product moment correlations with Bonferroni correction

Low-NPI Group
- NPI scores positively correlated with N170 latency for other-fear face stimuli
  r = .598, p = .007

High-NPI Group
- Higher levels of narcissistic traits were associated with N170 latency when viewing self-fear face stimuli
  r = -.630, p = .26
- Higher levels of empathy in the EQ measure were associated with shorter N170 latencies for other- and neutral-face stimuli
  r = -.807, p = .002; r = -.715, p = .009
- Higher EQ Cognitive Empathy subscale scores positively correlated with N170 latencies for other- and neutral-face stimuli
  r = . 749, p = .002; r = .781, p = .003

Discussion

AIMS

1. Narcissism and N170 Amplitude
   - High-NPI group differentiated between identity in the left hemisphere while the Low-NPI group did not differ.
   - The High-NPI’s enhanced amplitude to ‘other’ and attenuated amplitude to ‘self’ may reflect a heightened awareness of a potential threat.
   - The Low-NPI group responded similarly to self and other suggesting that others are not initially viewed as a potential threat .
   - This pattern of response may illustrate narcissists’ preoccupation on protecting their vulnerable self-concept.

2. Narcissism N170 Latency
   - The High-NPI group responded faster to ‘other’ compared to ‘self’ in the left hemisphere while the Low-NPI group did not differentiate.
   - Shorter latency to other-face stimuli may reflect efficient and practiced surface-level assessment of others useful for social strategies.
   - A delayed latency to self-face stimuli reflects the use of additional resources or effort to process themselves.
   - Additional resources may reflect the complexity of the High-NPI self-image -the flawed self they see and the superior self they project.

3. Narcissistic and Empathic Traits
   - Self-report measures did not indicate a relationship between grandiose narcissism and empathic traits.
   - A correlation between narcissism and empathy may have been confounded by covert narcissistic traits not assessed in the NPI.
   - Vulnerable narcissists may have responded less-truthfully on the empathy measures to maintain a socially acceptable facade.
   - In the High-NPI group, empathic and narcissistic traits associated ‘unconsciously’ with N170 amplitude and latency viewing neutral and fear-face stimuli of others. Ambiguous and emotional face stimuli of strangers modulated N170 magnitude.

CONCLUSIONS
- Narcissistic traits modulate face processing of ‘self’ and ‘other’ in the left hemisphere.
- N170 patterns reflect Kohut’s psychoanalytic and Morf & Rhodewalt’s grandiose and vulnerable theories of narcissism.
- Increased narcissistic traits elicit an alerted response to ‘others’ and require more resources when processing themselves.
- This sub-pathological sample self-report revealed no lack of empathic ability, yet in less than 200 milliseconds differentiated themselves from others while the Low-NPI group did not. This suggests an unconscious self bias in the High-NPI group.
- Left hemisphere differences supports research postulating its importance for ‘self’ and ‘other’ perspective taking (Kircher et. al., 2001). This suggests individuals with NPD may have poor interpersonal relationships due to self and other processing in the left hemisphere.

FUTURE RESEARCH
- ‘Self’ vulnerability is powerful social motivator, future research will address vulnerable narcissism as an important variable in NPD.
- Future research will compare a wider spectrum of emotions to clarify emotional associations observed in this current study.
- This study demonstrates social processing differences in a sub-clinical population, pathological populations should be addressed as well as other social disorders to illuminate further neural and social consequences of ‘self’ and ‘other’ processing.
- Clinically, this study can be applied to misidentification disorders such as Capgrass and Fregolie Syndrome as well as disorders with Theory of Mind deficits to investigate left hemisphere implications of self perception.
- The integration of psychoanalytic and neuroscientific theories of NPD informed this electrophysiological study, continued collaboration of these perspectives is encouraged for follow-up studies.

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Investigating the Relationship Between Pathological Gambling and Co-occurring Anxiety Disorders: A Behavioral Genetic and Epidemiological Study

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Psychoanalytic Mentor: Dr. William Sledge

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1. Introduction

Issues with Classification of PG

•Pathological gambling (PG) is currently defined as an impulse control disorder not otherwise specified.
• Included in this category are disorders such as: pyromania and kleptomania.
• Currently a debate as to how to best classify PG.

Different Perspectives for Understanding PG

Environmental, neuroscientific, and psychodynamic perspectives have been put forward to suggest categorizations of PG.

Environmental:
Importance of environmental factors to account for the initiation, development and maintenance of PG.
Example: trauma, mood states, availability.

Psychodynamic:
1) **PG as an addiction** (Freud, 1923)
2) **Gambling as a defense** (Bolen and Boyd, 1968)
Polarities Model – unconscious motivations to maintain balance with issues of self-definition and relatedness (Luyten & Blatt, in press).

Neuroscientific:
Includes neuroimaging and behavioral genetics.
Example: PG findings in neuroimaging and neurotransmitter studies similar to those of addictions.

PG and Co-morbidity

PG shares characteristics of internalizing and externalizing disorder subgroups respectively. May suggest that PG is not a homogenous category.

Externalizing patterns: maladjustment directed outwardly and share traits of impulsivity and acting out of emotions. For example: substance abuse.

Internalizing disorders: maladjustment primarily expressed inwardly, traits of anxiety, fear and misery and the ability to contain these emotions.

Focus of this thesis: Anxiety Disorders (AD) an example of an internalizing disorder frequently co-morbid with PG and AD.

2. Current Study & Hypotheses

The **purpose** of the present study was to investigate the relative influence of AD on the co-occurrence of subsyndromal and syndromal pathological gambling and psychopathologies, as well as their genetic and environmental association.

Epidemiological Study
Lower odds ratios would be observed in the associations between increasing gambling severity and psychiatric disorders in the group with AD as compared to those without AD.

Behavioral Genetic Study
Genetic and unique environmental factors would contribute individually to PG, generalized anxiety disorders (GAD) and panic disorder (PD), the co-occurrences between PG and GAD and PG and PD would be accounted for predominantly by genetic factors, based on previous observations of internalizing disorders relationship to PG (Potenza et al., 2005).

3. Method

Method of Epidemiological Genetic Study

Sample
First wave of the NESARC (*N*=43,093) were analyzed. The NESARC data include a nationally representative sample consisting of civilian non-institutionalized participants ages 18 and older.

Measures
Alcohol Use Disorder and Associated Disabilities Interview Schedule-Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, version (AUDADIS-IV; Grant et al., 2003a) a structured assessment tool, was administered by trained lay interviewers.
Based on DSM-IV criteria from AUDADIS-IV algorithms, the NESARC data set contains diagnostic psychiatric variables for the Axis I and II disorders.

Analysis
1. associations between gambling group status, AD group status and socio-demographic variables were examined to identify socio-demographic variables potentially influencing variables of interest
2. unadjusted weighted rates of psychiatric disorders were calculated, stratified by gambling and AD groups.
3. a series of logistic regression models were fitted where psychiatric disorders were the dependent variables

Method of Behavioral Genetic Study

Participants
Participants were male twins comprising the Vietnam Era Twin (VET) Registry. Both twins served during the Vietnam era (1965-1975) and were born between 1939-1957. There were a total of 7,869 successfully interviewed in 1992 to ascertain DSM-III-R psychiatric diagnoses.

Measures
Diagnostic Interview Schedule (DIS) for DSM-III-R (Robbins & Regier, 1991), lifetime diagnoses for PG, GAD and PD were determined. **GAD diagnosis:** period of at least one month of worry and the presence of six or more symptoms of GAD during a period of worry. **PD diagnosis:** panic attack and four or more symptoms during the panic attack, regardless of whether the attack was associated with phobia (Chantarujikapong et al., 2001).

Hypothesis Testing
To investigate the hypotheses the genetic and environmental contributions to the co-occurrences of PG and GAD and PG and PD, bivariate models fitting the association between PG and GAD and PG and PD, were examined Potenza et al., 2005; Slutske et al., 2000). The most parsimonious was selected for best fit.

4. Results

Epidemiological Study Results

Increased gambling severity was associated with Axis I and II psychopathology in both with AD and without AD groups.

Significant anxiety-by-gambling-group interactions were observed for many disorders, particularly mood and personality disorders.

Table 1.
Adjusted Associations Between Gambling Problem Severity and Psychiatric Diagnoses, Stratified by Anxiety Disorder (AD) Status[a]

	With an Anxiety Disorder			Without an Anxiety Disorder			AD vs Non-AD Group Interaction		
Diagnosis	OR for Low-risk vs. Non/LF-gamblers[c]	OR for At-Risk vs Non/LF-gamblers	OR for prob/path vs Non/LF-gamblers	OR for Low-risk vs. Non/LF-gamblers	OR for At-Risk vs Non/LF-gamblers	OR for prob/path vs Non/LF-gamblers	Low-risk gamblers	At-risk gamblers	Prob/ path gamblers
Any Axis I Disorder	2.78†	2.07	5.23*	3.1	4.08†	9.26†	0.9	0.51	0.56
Major Depression	1.23	0.64	1.2	1.5*	2.45†	4.24†	0.82	0.26*	0.28
Dysthymia	1.04	2.56	0.25	1.79*	3.00	3.5	0.58	0.85	0.07*
Mania	1.3	1.12	3.31	2.02*	4.85†	7.08†*	0.64	0.23*	0.47
Hypomania	1.84	1.73	0.37	3.57	1.9	1.03	0.52	0.91	0.36
Alcohol ab/dep [b]	2.34†	2.54*	3.62†*	2.79†	3.18†	8.82†	0.84	0.8	0.41
Drug ab/dep	2.29†	0.51	1.72	2.64	3.06	0.52	0.87	0.17	3.29
Nicotine dep	1.58*	3.01*	4.6*	2.62†	3.95†	6.01†	0.6*	0.76	0.76
Any Axis II Disorder	1.56*	2.82*	2.88	2.48†	6.00†	7.57†	0.63*	0.47	0.38
Paranoid	1.96†	4.29†	2.28	1.91**	5.71†	7.5†	1.03	0.75	0.3
Schizoid	1.24	3.76†	0.72	1.78*	4**	7.15†	0.70	0.94	0.1**
Antisocial	1.38	3.74	3.24	2.84†	3.51†	9.54†	0.49*	1.06	0.23*
Histrionic	1.89*	2.31	6.5†	2.94†	6.95†	4.78**	0.64	0.33	1.36
Avoidant	0.99	1.98	0.9	2.41**	2.33	10.27†	0.41	0.85	0.09**
Dependent	1.06	1.62	0.77	Unstable	5.17*	25.27†	Unstable	0.31	0.03†
Obsessive-compulsive	1.71*	2.3*	1.82	2.08†	3.6†	3.87†	0.82	0.64	0.47

Note. [c] Non/LF=non or low-frequency gamblers
[a] ab/dep=abuse or dependence
†p<.05, **p<0.01, * p<.001
[b]Odds Ratios (OR) are adjusted for age, race/ethnicity, marital status, education, employment, and income.

Behavioral Genetic Study Results

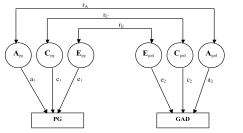
Both genetic and unique environmental factors contributed individually to PG, GAD, and PD.

Best fitting model indicated relationship between PG and GAD was attributable predominantly to shared genetic contributions (r_a =0.53).

In contrast, substantial correlations were observed between both the genetic (r_a=0.34) and unique environmental (r_e =0.31) contributions to PG and PD.

Behavioral Genetic: Bivariate Models

Figure 1A. BIVARIATE MODEL: PG and GAD

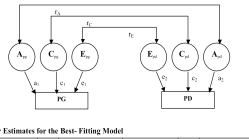


Parameter Estimates From The Best Fitting Model

	a^2	c^2	e^2	r_A	r_C	r_E
PG	0.65 *	0.0	0.35 *	0.53 *	0.0	0.0
GAD	0.38 *	0.0	0.62 *			

* Parameters are statistically significant (the 95% CI does not include 0 or 1).

A schematic diagram for the bivariate biometric model examining the relationship between pathological gambling (PG) and generalized anxiety disorder (GAD). Factors including PG and GAD include additive genetic factors (A), shared environment (C), and unique environment plus error (E). Correlations between these factors across disorders are represented as r_A, r_C, and r_E respectively. The contributions of each of these factors to PG (a_{PG}, C_{PG}, e_{PG}) and GAD (a_{GAD}, c_{GAD}, e_{GAD}) are also indicated. CI indicates confidence interval and lowercase a, c, and e refer to path loading for factors A, C, and E respectively.



Parameter Estimates for the Best- Fitting Model

	a^2	c^2	e^2	r_A	r_C	r_E
PG	0.64 *	0.0	0.36 *	0.34 *	0.0	0.31 *
PD	0.43 *	0.0	0.57 *			

Figure 1B. Bivariate model: PG and PD. A schematic diagram for the bivariate biometric model examining the relationship between pathological gambling (PG) and panic disorder (PD). Factors including PG and PD include additive genetic factors (A), shared environment (C), and unique environment plus error (E). Correlations between these factors across disorders are represented as r_A, r_C, and r_E respectively. The contributions of each of these factors to PG (a_{PG}, C_{PG}, e_{PG}) and PD (a_{PD}, c_{PD}, e_{PD}) are also indicated. CI indicates confidence interval and lowercase a, c, and e refer to path loading for factors A, C, and E respectively. *Parameters are statistically significant (the 95% CI does not include 0 or 1).

5. Discussion

Epidemiological Study

The interactions suggested a stronger relationship between gambling severity and psychopathology in participants without AD than in those with AD.

It was concluded that AD influence the patterns of co-occurrence between gambling and Axis I and Axis II psychopathologies, appearing to account for some of the variance in the risk for gambling-associated psychopathology.

Behavioral Genetic Study

Shared genetic contributions between PG and both GAD and PD suggest specific genes, perhaps those involved in affect regulation or stress responsiveness, contribute to PG and AD.

Overlapping environmental contributions to the co-occurrence of PG and PD suggest that common life experiences contribute to both PG and PD. Conversely, the data suggest that distinct environmental factors contribute to PG and GAD (e.g., early onset of gambling in PG).

General Discussion

This thesis demonstrates that PG may not be a coherent syndrome, and illustrates subtypes of PG (exhibiting internalizing and externalizing characteristics respectively)

An integrated multifaceted model (combining **neuroscience** and **psychodynamic** principles) may be best suited to understand the proper categorization of PG. This thesis provides such an integrative model of PG that takes into account both **theory** and **empirically** derived data (Figure 2a and 2b).

Figure 2a. Multifaceted model of pathological gambling – Combining the polarity model, personality facets and internalizing/ externalizing model to account for externalizing characteristics of PG. *Note.* All the factors are interrelated.

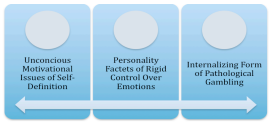


Figure 2b. Multifaceted model of pathological gambling – Combining the polarity model, personality facets and internalizing/ externalizing model to account for internalizing characteristics of PG. *Note.* All the factors are interrelated.

6. Conclusion

Psychodynamic theory as exemplified in the polarity model, can help inform the I/E model by accounting for the **unconscious motivations** that are associated with PG.

It is hoped that this thesis demonstrates that with more study **it is possible to integrate** some of the psychoanalytic insights of human nature and of the apparent repetitive self-destructive aspect that is present in PG. In doing so a more robust understanding of PG can be achieved by moving away from a symptom-based categorization to incorporating motivational facets of understanding.

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Stress and eating behavior: The influence of dietary restraint on the ability to resist

THE ANNA FREUD CENTRE
DEDICATED TO THE WELL-BEING OF CHILDREN

Lauren Panicek, Masters of Science, Psychodynamic Developmental Neuroscience

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Introduction

Restrained and emotional overeating patterns can lead to obesity. Restrained eating refers to individuals who limit their food intake in order to control weight[1], and emotional overeating is when individuals consume large quantities of food as a way to manage negative emotional states[2]. Previous research has shown that restrained eaters and high emotional overeaters tend to eat more in comparison to unrestrained and low emotional overeaters in response to stress[3,4,5,6,7,8,9,10]. The present study sought to measure the amount of time an individual could resist eating, as well as caloric intake once they began to eat, in response to stress.

Psychological Development of Eating Patterns. The primary caregiver and food are initially fused in the infant's mind, with food serving to fulfill the basic need of satisfying the hunger drive. Thus, food and relationships are inextricably linked to one another. The processes of eating can be infused with numerous libidinal and aggressive meanings. Even though the primary caregiver and food become separated in the infants mind as development continues, unconscious links between the primary caregiver and eating will always remain[12]. Early on, food serves as a substitute for the primary caregiver during times of stress, and this interaction between caregiver and food can make eating a tremendous source of pleasure or pain. Stress in infancy leads to frustration, and food is a source of gratification that can reduce the frustration. The way that an individual manages stress in childhood will influence the management of stress in adulthood, just as early eating experiences will influence eating behaviors throughout life. The connections between the frustration, food, and eating in infancy impact the way an individual will use food as a way to cope with stressors in adulthood.

Physiological Stress Response. The hypothalamic-pituitary-adrenal (HPA) axis is the regulating system for an individual's hormonal stress response. When a person experiences stress, the HPA axis is activated through the release of corticotrophin-releasing hormone (CRH) from the hypothalamus. CRH then activates the anterior pituitary gland, which secretes adrenocorticotropin hormone (ACTH), causing the adrenal glands to release cortisol13.

Neurological Activation in Restrained and Emotional Overeating. When fed, unrestrained eaters show activity in brain areas involved in inhibition of further eating (right prefrontal cortex), as well as areas thought to be involved in signaling the termination of a meal (left cingulate gyrus). However, restrained eaters show increased activation in areas associated with hunger, and expectation of reward (orbitofrontal cortex), decision making, and monitoring of behavioral consequences (left dorsolateral prefrontal cortex), and desire for food (left insular cortex)[14].

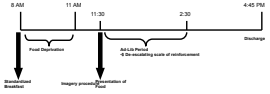
Consumption of food leads to activation of areas in the brain associated with reward. The fronto-amygdalar pathway and the Papez circuit, which integrates the hypothalamus with the hippocampus and the thalamus, are two of the main circuits for reward pathways in the brain[15]. These areas have high connectivity with the limbic system, and it has been demonstrated that an individual's emotional state can impact the saliency of stimuli[15], illustrating how emotional overeating could be reinforced neurologically. Female emotional eaters have shown greater bilateral activation in the parahippocampal gyrus (a limbic region implicated in the anticipated reward from food consumption) and the anterior cingulate (which has been associated with reward and food palatability) during negative mood states, compared to neutral states. Increased activation of these areas was also seen when comparing emotional to nonemotional eaters during the negative mood, but not during the neutral condition[16]. This hyperactivation of reward circuitry in response to food during negative mood may be a risk factor for emotional binge eating[16].

Method

Of the 31 individuals screened, 17 were eligible to participate in this study. Fourteen participants between the ages of 18 and 65 completed the study. The sample was comprised of 8 men and 6 women, consisting of 8 African Americans and 6 Caucasians. Subjects were excluded if they had any significant current psychiatric or medical conditions, were anorexic or bulimic, tested positive for psychotropic or illegal drugs, or were pregnant or nursing.

Based on their responses to the Dutch Eating Behavior and Emotional Overeating Questionnaires[25, 2], participants were divided into high and low restrained eating groups, and into high and low emotional overeating groups. They also with a PhD-level clinician to develop a personalized stress and neutral imagery scripts. The clinician identified stimulus and response details from recent experiences of the participant, and concentrated on specific contextual details in order to mirror the physiological responses experienced during the real-life experiences. The scripts of the stress and neutral imageries were made into separate audio recordings.

Subjects arrived at the lab at 7:30 a.m., after having not eaten after 10 p.m. the previous night, and were provided with a standardized breakfast of fruit juice and a granola bar. Between 8:00 a.m. and 11:00 a.m., the participant was permitted to engage in a leisure activity of their choosing. At 11:00 a.m. the script (stress or neutral, counterbalanced) was played, and the participant was asked to continue imagining the scene described to them for as along as possible.



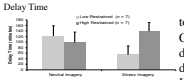
At 11:30 a.m. 5 servings each of 3 highly palatable salty and 3 highly palatable sweet snacks were presented. The participant was instructed that they could eat as much or as little of the food as the wished until 12:30 p.m., and that they would receive $.20 for every minute they delayed eating. These instructions were given again at 12:30 p.m., with the amount dropping to $.10, and again at 1:40 p.m., with the amount dropping to $.05. At 2:40 p.m. the food was removed and weighed to calculate the amount of calories consumed. Following the three-hour ad-lib eating period, the participant was kept an additional 2 hours in order to create a cost-response period to prevent the participant from being able to eat directly after the lab. The response-cost period was used to establish a consequence for not eating during the ad-lib eating session.

Analysis. For both hypotheses, multivariate analysis of variance were performed with restrained eating (low/high) or emotional overeating (low/high) as between subject variables and imagery condition (stress/neutral) as a within subjects variable. The dependent measures were the delay to start eating and the amount of calories consumed. Differences in food craving for positive reinforcement and for negative reinforcement by group and imagery were examined, and a manipulation check was also performed to assess the effectiveness of the neutral and stress imagery to influence mood, and to determine whether the groups (restrained eating, emotional overeating) differed in their responsiveness to the imagery presentations. Covariates for the analyses included BMI to control for possible variability in height and weigh, as well as any significant demographic variables. The order of imagery presentation was included to control for possible order effects of the stress and neutral imagery scripts.

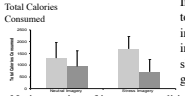
Results

Restrained Eating

Delay Time



Total Calories Consumed

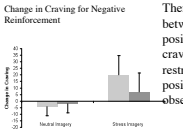


The delay to eating across restrained eating groups illustrated a trend with towards an interaction between imagery condition and restrained eating, $p = .09$, Cohen's $d = 1.28$. The large effect size suggests that with more participants the difference would reach significance. In comparison to the neutral condition, the delay to eat in the low restrained group was lower following the stress condition. In the high restrained eating group, however, the opposite was observed. Delay to eat was greater following the stress imagery than following the neutral imagery. There was also a trend with a large effect size towards a main effect of imagery on the delay time, $p = .07$, Cohen's $d = 1.36$, with the delay time being shorter in response to the stress imagery. No main effect of restrained eating group on delay time was observed.

No interaction of imagery condition by restrained eating was observed. No main effects of imagery or restrained eating group on calories consumed were observed.

Change in Craving for Positive Reinforcement

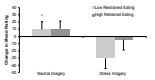
Change in Craving for Negative Reinforcement



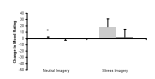
There was no significant interaction between imagery and restrained eating on positive or negative reinforcement food cravings. No main effects of imagery or restrained eating group on craving for positive or negative reinforcement were observed.

Mood and restrained eating. A significant main effect of imagery was seen on positive mood ratings, $F(1, 9) = 12.33$, $p < .01$, Cohen's $d = 2.34$. Regardless of restrained eating group, participants showed an increase in positive mood following the neutral imagery and a decrease in positive mood following the stress imagery. No main effect of restrained eating group on positive mood ratings was observed, and there was no interaction of restrained eating group and imagery on positive mood ratings was observed. A trend with a large effect size towards an impact of imagery on negative mood ratings was shown, $F(1, 9) = 4.22$, $p = .07$, Cohen's $d = 1.37$. Regardless of restrained eating group, negative mood increased following the stress imagery, and stayed relatively constant following the neutral imagery. There was no main effect of restrained eating group on change in negative mood ratings, and no interaction of restrained eating group and imagery was observed.

Change in Positive Mood Rating

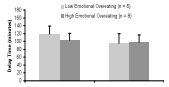


Change in Negative Mood Rating

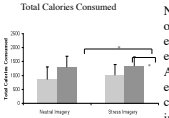


Emotional Overeating

Delay Time



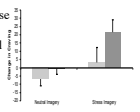
Total Calories Consumed



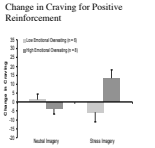
No interaction of imagery condition by emotional overeating eating was observed on delay to start eating, and there were no main effects of imagery, or emotional overeating eating group on delay time. Also, no interaction of imagery condition by emotional overeating eating was observed on total calories consumed. There were no main effects of imagery or emotional overeating eating group, on total calories consumed, either.

The interaction between imagery and emotional overeating on food craving for positive reinforcement was significant, $F(1,9) = 5.28$, $p = .05$, Cohen's $d = 1.53$. The low emotional overeaters showed a slight increase in craving after the neutral imagery, and a decrease in response to the stressful imagery. The high emotional overeaters showed a decrease in cravings after exposure to the neutral imagery, and a large increase in response to the stressful imagery. No main effects of imagery or emotional overeating group were observed on craving for positive reinforcement.

Change in Craving for Negative Reinforcement

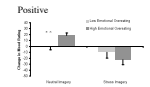


Change in Craving for Positive Reinforcement

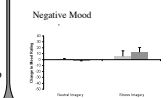


No significant interaction was observed between imagery and emotional overeating and no main effect of imagery on craving for negative reinforcement was observed. However, there was a trend with a large effect size towards a main effect of emotional overeating group on craving for negative reinforcement, $F(1, 9) = 4.45$, $p = .06$, Cohen's $d = 1.41$, on craving for negative reinforcement. The high emotional overeating group showed larger changes in craving following imagery procedures, while the low emotional overeaters' craving change remained more constant.

Positive



Negative Mood



Mood and emotional overeating. A significant main effect of imagery was seen on positive mood ratings, $F(1, 9) = 15.43$, $p < .01$, Cohen's $d = 2.62$. Following the neutral imagery, the high emotional overeaters reported an increase in positive mood, while the low emotional overeaters' mood remained relatively unchanged. No main effect of emotional overeating group on positive mood ratings was observed, but a trend towards an interaction of emotional overeating group and imagery was observed, $F(1, 9) = 3.86$, $p = .08$, Cohen's $d = 1.31$. There was also a trend towards an effect of imagery on negative mood ratings, $F(1, 9) = 3.58$, $p = .09$, Cohen's $d = 1.26$. Regardless of emotional overeating group, negative mood increased following the stress imagery, and remained relatively unchanged following the neutral imagery. There was no main effect of emotional overeating group on change in negative mood ratings, and no interaction of emotional overeating group and imagery was shown.

Discussion

Emotional overeaters and craving. High emotional overeaters were the only group to show an increase in craving in response to the stress imagery. This finding is consistent with previous theories regarding emotional eating, as individuals who eat in response to negative emotions should report higher food cravings following stressful imagery. While high emotional overeaters reported increased cravings, they did not, however, actually consume more calories in response to the stress imagery. Previous research has shown that restrained eating was only loosely correlated with cravings, but a strong association was found between emotional eating scores and craving. There has also been very little association demonstrated between craving and actual caloric consumption[17]. Together with past research, the present findings suggest that craving scores do not predict amount of caloric intake.

Delay times. This was the first study to consider the ability to resist eating, rather then solely focusing on the amount of calories consumed. The single group difference observed was that high restrained eaters showed increased delay times following the stress imagery, while low restrained eaters showed larger delay times in response to neutral imagery. While this results were not consistent with our hypothesis, it may be possible that restrained eaters are more capable of delaying eating, as they regularly practice trying to resist eating highly caloric food, but that once they do decide to start eating, they consume more. The possible reasons that this study failed to show higher caloric intake in restrained eaters are explored below.

Stress Response of restrained eaters. Restrained eaters have been shown to have elevated levels of baseline cortisol, which has been hypothesized to be a result of the chronic stress of being preoccupied with food and weight[18]. The restrained participants may have experienced an increased and sustained level of stress in response to their anticipation of having to try to resist highly palatable, high caloric snack options, leading them to report fewer mood changes in response to the stress imagery.

Impact of being watched and self-awareness. Restrained eaters have been shown to eat to more "normally" when in the presence of others, versus being alone [19,20]. While being observed, restrained eaters eating behavior following a preload mimicked that of unrestrained eaters. However, when not observed, restrained eaters ate significantly more following the preload. In the current study, participants were very aware of being videotaped and that their caloric consumption was being closely monitored. Every 15-20 minutes a research assistant would also be present in the room for about 5 minutes, in order to administer questionnaires and physiological measures, which may have caused the restrained eaters to conform to what they feel is more normative eating behavior. Self-awareness has also been shown to impact restrained eaters behavior[19, 21, 22]. As no distractions were available, since the participant was in the room with only the food and no other means of entertainment, it is more likely that the individuals were reflecting on themselves, making eating as a way to escape less attractive.

Boredom. When faced with stress in a real life situation, there are many distractions that an individual can utilize. However, in this controlled laboratory experiment, food was the only source in their environment of distraction or engagement. Especially in a culture where stimulation is constant, this setting could have resulted in high levels of boredom or frustration for the participant. Psychoanalytically, boredom is a transient state that can be experienced as an emptiness, which could be construed as hunger[23]. This boredom could also be a frustration or stressor in and of itself, as it has been demonstrated that a bored person is in a state of dammed-up instinctual tension,[24] illustrating that boredom is a complex affect state in its own right.

Future Research

Research on restrained eating has focused almost exclusively on females, and no research has been done to compare the sexes. Further research is needed to determine how male restrained eaters may differ from female restrained eater. Longitudinal studies on restrained eating could also provide insight to how these behaviors develop over time. Research examining the infant feeding experiences of restrained eaters could shed light on how these behaviors develop over time. By incorporating qualitative interviews and questionnaires from both parents and their children, early feeding experiences could be used to contextualize the development of adult eating behaviors.

The obvious attention on eating, being watched, and the high degree of self-awareness in this study most likely had an impact on the findings. Redesigning the paradigm to reduce or eliminate these confounds could yield different results. Studies that have masked the eating as taste tests have been successful, but would not work in a study looking at the ability to resist. By simply providing a distraction such as movie or light cognitive task, the attention on having food intake monitored and self-awareness might be diminished.

Past research regarding the stress response has focused almost solely on cortisol as the physiological marker of stress. However, measures of stress beyond cortisol should also be considered. The bulk of research exploring stress responses focus on cortisol as the main physiological measure of stress. However,the role of other glucocorticoids, such as prednisone, prednisilone, methylprednisilone, dexamethasone, and hydrocortisone need to be explored.

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Beneath the Surface of Consciousness: An Event-Related Potential Study of Emotional Processing in Patients with Generalized Anxiety Disorder

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Research Mentors: Drs. Douglas Mennin, Helena Rutherford, & Linda Mayes
Psychoanalytic Mentor: Dr. Susan Bers

Introduction

Worry, the principal manifest symptom of Generalized anxiety disorder (GAD), may be considered the mere tip of an iceberg, an indicator of more fundamental unconscious issues beneath the surface which, according to the Emotion Dysregulation model (Mennin et al., 2005), reflect deficits in emotion generation and regulation.

To understand what lies beneath the consciously experienced symptom, worry, it is important to understand better the emotional issues that may automatically elicit the use of worry as a defense. Affective neuroscience and psychoanalysis represent two distinct fields of study, both of which are fundamentally interested in such implicit emotional issues.

Modern neuroimaging techniques enable observation, at least to a certain extent, of *neuro-affective unconscious* processes, which in turn may be interpreted to reveal some of the *dynamic unconscious* processes discussed by psychoanalytic writers. In this context, psychoanalytic theory may provide important insight into the neurobiological study of emotional processing in GAD.

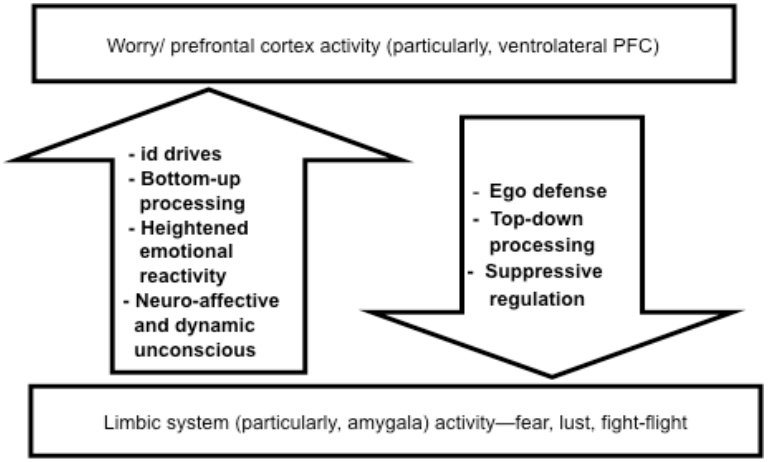

Figure 1. Model of emotional processing using psychoanalytic and affective neuroscience terminology.

Overview of study and methodology

The present study employs EEG and ERPs to explore underlying emotional processing differences in GAD patients (N= 7) and healthy controls (N = 12) as they view pleasant, unpleasant, and neutral IAPS photographs.

This study specifically examined the Late Positive Potential (LPP), a midline, positivity in the ERP evident approximately 400 ms following stimulus onset, which may index attention to motivationally relevant stimuli (e.g., Hajcak et al., 2006).

It was expected that healthy controls but not GAD patients would exhibit enhanced LPP amplitudes to emotional compared to neutral photos.

It was expected that the GAD group, compared with the control group, would exhibit reduced LPP amplitudes to pleasant and unpleasant pictures.

Results

Repeated measures ANOVA demonstrated, as expected, a main effect of stimulus type in the control group ($F(1, 11) = 4.16$, $p = .029$) but not in the GAD group ($F(1, 6) = 2.31$, $p = .136$). Specifically, the LPP response to neutral pictures was significantly reduced compared to pleasant pictures ($t(11) = 3.63$, $p = .004$, $d = .84$) and was marginally reduced compared to unpleasant pictures ($t(11) = 2.09$, $p = .060$, $d = .73$), whereas the LPP to pleasant and unpleasant pictures did not differ significantly ($t(11) = .200$, $p = .845$, $d = .05$).

Significant interactions between group and stimulus type were not found ($F(1,18) = .22$, $p = .802$) but Cohen's d effect sizes suggest that the GAD group compared with the control group exhibited reduced LPP responses to neutral and unpleasant pictures (see Table 1).

Table 1
Differences in LPP amplitudes (mv) between the GAD (N = 7) and control (N = 12) groups by stimulus type

	M		*SD*		*Cohen's d*	*t*	*df*	*p*
	GAD	C	GAD	C				
Pleasant	0.94	1.09	0.94	0.96	.16	-.33	17	.744
Unpleasant	0.53	1.02	1.27	1.03	.42	-.93	17	.367
Neutral	0.05	0.34	0.89	0.83	.34	-.70	17	.495

Note. GAD = Generalized Anxiety Disorder; C. = Control.

Discussion

Although these findings are limited by a small sample size, they are consistent with previous fMRI study, which suggests that patients with GAD suppress their responses to emotional stimuli, and moreover demonstrates that this may occur as early as 400 ms post-stimulus exposure.

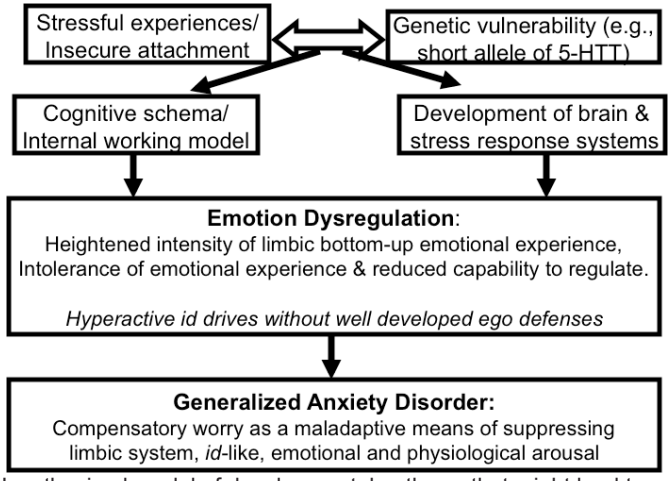

Figure 2. Hypothesized model of developmental pathway that might lead to emotion dysregulation and GAD.

Conclusion: It is hoped that this experiment will contribute to a better understanding of the underlying emotional problems associated with GAD so that these may ultimately be targeted in treatment, helping to alleviate excessive worry in GAD sufferers.

Probing the Neural Correlates of Maternal Exclusion and Reunion in Middle Childhood: An Analog of the Strange Situation Procedure

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Introduction

❖The mother contributes to the development of their child's internal working model and attachment style .
❖There is not an equivalent of the Strange Situation Procedure (Ainsworth, et al., 1978) in middle childhood .
❖Separation anxiety is not enough to activate the attachment system in middle childhood, because the child has an internal representation of the mother and can use mentalizing capacities to interpret events.
❖Nevertheless, distressing social interactions can activate the attachment system and the need for protection and explanation of events.
❖ Peer exclusion elicits social pain and distress.
❖Cyberball is a program that simulates an exclusion condition and has been used in the context of peer interaction. It consists of 2 phases, fair play and exclusion.
❖A modified version of Cyberball with a 3rd phase of fair play called reunion was used to compare avoidant and secure attachment styles as an analog to the Strange situation Procedure.
❖ This version had not been tested between mothers and children .

The Current Study

This study employed the Cyberball social exclusion – reunion paradigm to compare children who were excluded by and reunited with unfamiliar peers with children who were excluded by and reunited with their mother and an unknown peer .

Quantitative Hypotheses

1. Children who are excluded by their mother would show a greater frontal negative slow wave voltage in anterior cortical regions during the exclusion condition compared to the children excluded by an unfamiliar peer.
2. Children who are rejected by their mother would report greater distress on the ostracism distress measure compared to children who are rejected by peers.
3. Children who are excluded by their mother would show a larger difference in the late slow wave for inclusion events from fair play 1 to reunion, compared to children rejected by their peer, suggesting differential engagement post rejection across the groups.
4. Children who are excluded by their mother will show a greater reduction in their ostracism distress response (self-report) after the fair play- reunion phase as opposed to children rejected by peers.

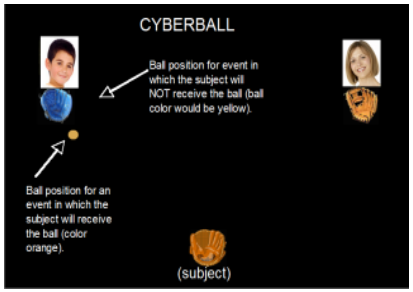
Qualitative Questions

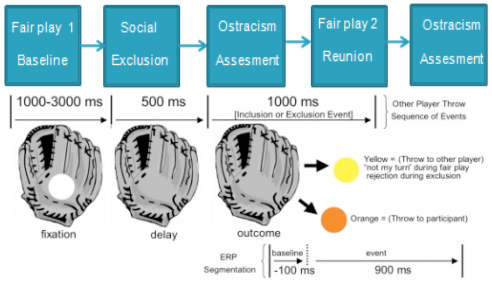
1. Is the exclusion-reunion Cyberball paradigm a suitable analog of the Strange Situation Procedure in middle childhood?
2. How do the children experience this procedure in terms of mentalization processes?

Methods

Participants: 29 typically developing children (14 female, 15 male) participated in the experiment. Ages ranged from 8 to 12 (M = 10.35). Children were recruited through a mass mail conducted in the area of Connecticut . They were divided in two groups maternal exclusion and peer exclusion.

Cyberball Exclusion-Reunion Task (Crowley et al., 2009). It is a computer program that simulates a virtual ball-toss game. In it, each participant is led to believe that they will play with an unknown peer and their mother on the computer. It included three behavioral phases, fair play, social exclusion and reunion.





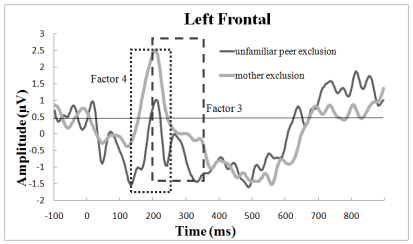
EEG Recording: A high-density EEG was recorded from 128 Ag/AgCL electrodes (EGI, Inc.) with Netstation v.4.2 software (EGI, Inc.) and EGI high impedance amplifiers, sampled at 250hz (.1 Hz high pass, 100 Hz, low pass). All electrodes were referenced to Cz for recording. Impedances remained at or under 40k ohms. The E-prime v.1.2 software package controlled the stimulus presentation.

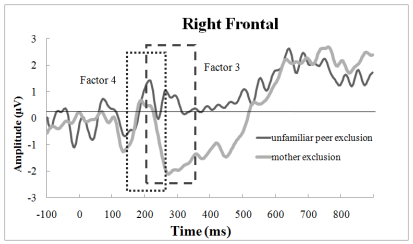
Ostracism Distress Measure: Child perceptions of ostracism distress were measured after the social exclusion and reunion phases of the procedure with the Need Threat Scale, a 20 item questionnaire that measures belonging, self esteem, meaningful existence, and control (Williams & Jarvis, 2006).

Qualitative Interview: Children's feelings and thoughts about the exclusion an reunion conditions were investigated, as well as their attributions about these events and their mother's characteristics.

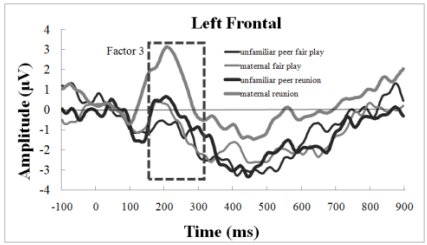
Results

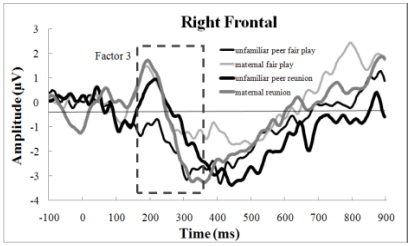
Both groups presented more distress after the rejection and less distress after the reunion, but there were no significant differences between the groups ($t(27) = .47$, *ns*).
A principal component analysis (PCA) was carried to isolate the slow wave. Frontal slow wave neural responses did not differentiate the groups during the rejection ($F(1, 20) = .32$, *ns*) or the fair play and reunion (F s < 1.40, *ns*) portions of the game.
During rejection events, the maternal exclusion group showed a larger left-frontal P2 component, and a larger right frontal N2 component.





During the reunion phase, throws to the subject by their mother produced a pronounced left-frontal P2 component.
There were no significant differences in the right frontal area in the reunion phase.





In the qualitative interview , children gave possible explanations to their mother's exclusion, and used negative feelings describe the exclusion and positive feelings to describe the reunion condition. They used positive adjectives to describe their mother. They showed a capacity to reflect on their own mental state during the task. The debrief is what better enabled the children to be willing to engage in the interview, change their mood and describe their experience.

Discussion and Conclusion

Both maternal and peer exclusion are a distressing experience, but maternal exclusion induces rapid neural responses that peer exclusion does not induce.

The left frontal P2 suggested exclusion and reunion were more salient for the maternal exclusion group. From an attachment-developmental perspective, this could suggest that in middle childhood, selective attention is elicited if an affective bond is momentarily disrupted because it is a threat to survival and the mother's behavior will remain salient until there is no threat which in this case was the end of the task.

The larger right frontal N2 component during exclusion for the maternal exclusion group suggested that this type of rejection event engaged more conflict monitoring processes that can be used to understand logical rules and recognize patterns of consistency and inconsistency in the context of affective bonds. This implied that children have an idea of the usual behavior of the mother and found their exclusion inconsistent and the reunion consistent with it.

Both capacities are fundamental to effectively mentalize the intentions of others. Verbal explanations of the events are most effective to help children understand and recover from a threatening situation.

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Understanding Maternal Mind-Mindedness and Reflectivity in Infants At-Risk for Autism Spectrum Disorder: Associations for Language and Social-Communication Skills

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Background

- **Mother and Infant Interactive Process:**
  - Fosters language and social skills, emotion regulation and mental state representation in children (Fonagy et al., 2007)
  - Mind-mindedness (MM): the proclivity to treat one's infant as an individual with a *mind*, rather than merely an entity with needs that must be satisfied (Meins, 1997).
  - Maternal linguistic style and MM aids Theory of Mind (ToM) development (Meins et al., 2002; 2003).
- **Autism Spectrum Disorder (ASD)**:
  - Linguistic ability & ToM understanding are closely linked (Jenkins & Astington, 1996) , and children with ASD can present difficulties in both domains.
  - Synchronous behavior during parent-child interaction show gains in social communication & language development in ASD children (Siller & Sigman, 2002; 2008).
- **Infant Siblings of ASD:**
  - 5-10% of siblings of children with ASD have a risk of developing autism themselves (Micali, Chakrabarti, & Fombonne, 2004),
  - Studying infant siblings can lead to further understanding of early emergence of symptoms.
- **High-risk and low-risk siblings and MM:**
  - To date, no study has investigated MM with infants at a high-risk for developing ASD (HR) compared to infants at a low-risk for developing ASD (LR).

Research Aims & Hypotheses

(1) **Aim**: To explore MM and other types of maternal discourse in mothers with HR and LR infants
Hypothesis: LR mothers would utter more MM comments than mothers with HR children

(2) **Aim**: To explore associations between maternal discourse and children's development of language and social functioning.
Hypothesis: Maternal discourse would positively correlate with child behavioral measures across both groups

Methods

Participants

Mother and infant dyads (N = 34)

	HR	LR
N	23	11
Child Age (months)	12.6	12.7
Mother Age (yrs)	37.6*	34.3
Maternal Education Level (yrs)	16.4	18.6*
Total number of children in family	2.3*	1.3

* Statistically significant a p < .05 level

Procedure

Phase 1: Parent-Child Interaction and Coding

- Parents were instructed to play with their children as they normally would with a standard set of toys (see Methods). Interactions were videotaped for 5 minutes.
- 2 min. of parent-child play was viewed and coded using The Observer® (NOLDUS) by a main coder who was blind to the risk-status of the groups.

An external coder coded 33% of all videos for all codes. Interrater reliability was 92%, Kappa = .80 (p < .01).

Phase 2: Child Development Measures of Social and Language Skills

Trained clinicians blind to infants' risk status assessed all infants using the following measures:

- *Mullen Scales of Early Learning* (Mullen 1995):
  - **Verbal-t score**: Receptive + Expressive Language
  - **Nonverbal-t score**: Gross Motor + Visual Reception
- *The ADOS-T (Autism Diagnostic Observation Schedule for Toddlers,* (Luyster 2009)*:*
  - **ADOS-T score**: ADOS-Social Affect + ADOS-Restrictive and Repetitive Behavior

Maternal Comment Codes

- COMMENT: a discrete sound, single word, or sentence uttered by the mother, coded as per the following criteria:

- **Mind-minded (MM)**:** addressed the *mental* processes of the child. EX: "You like that doll" ; "You want that toy"; "You're frustrated".

- **Experience-minded (EM):** addressed the *physical* states, *needs*, or *actions* of the child's experience. EX: "You're putting the piece in"; "You're sleepy".

- **Directive (DIR):** captured the child's attention, reprimanded the child, or suggested a physical action. EX: "Stack the blocks"; "No, come back".

- **Narrative (NARR):** described toys or actions, or narrated the play. EX: "This is the baby's bottle"; "Mommy has a book".

- **Other:** extraneous or praise-related comments. EX: "Good girl"; "Uh-huh".

Global Codes

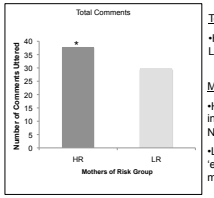
REFLECTIVE: MM + EM comments → encompassed the mother's reflection on their infant's physical, emotional, and mental experience.

SCAFFOLDING: DIR +NARR comments → encompassed the mother's attempt to enhance and scaffold learning through play.

** Mind-mindedness coding adapted from Meins & Fernyhough, 2006

Results

Maternal Discourse: total number of comments during interaction and comment codes

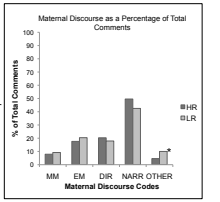


Total Comments

- HR mothers spoke more than LR mothers (F= 4.5, p = .004)

Maternal Discourse Codes

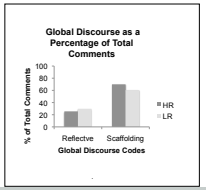
- HR and LR mothers did not differ in number of MM, EM, DIR or NARR comments (p > .05)
- LR mothers uttered more 'extraneous' comments than HR mothers (F= 4.2 ; p = .05)



Maternal Discourse Global Codes: Reflective and Scaffolding comments

- HR and LR mothers did not differ in Reflective or Scaffolding comments
- Scaffolding comments were approaching significance for HR group

(p = .06; Cohen's *d* = 0.7)



Child Behavioral Measures and Associations with Maternal Comments

Child Scores	HR: M (SD)	LR: M (SD)
Verbal	43.6 (9.2)	50.5* (6.1)
Nonverbal	56.9 (7.3)	55.9 (8.2)
ADOS-T	10.8* (5.3)	5.6 (2.9)

* p< .05

Correlations		High risk			Low risk		
		ADOS-T	verbal	nonverbal	ADOS-T	verbal	nonverbal
Total Comments	r	-0.30	0.15	0.42	-0.20	0.74	-0.17
	p	0.18	0.49	**0.05***	0.59	**0.02***	0.63
	N	23	23	23	11	11	11

r = Pearson's correlation coefficient, 2-tailed * p <.05 level

ANOVA:
- HR children: lower verbal scores & higher ADOS scores (p <.05)
- No difference for nonverbal scores

CORRELATIONS:

- HR: positive correlation with child nonverbal scores (Mullen) and total comments
- LR: positive correlation with child verbal scores (Mullen) and total comments
- No correlations for with ADOS-T

Conclusion

- HR mothers made as many reflective comments as LR mothers and produced more overall comments, despite HR infants having lower verbal and social-communication skills
- HR and LR mothers were possibly picking up on the skills of their children: HR mothers may have verbally responded to child nonverbal communication, and LR mothers to child verbal communication

- Implications:
  - Psychoanalytic theory may interpret findings as "overcompensating" behavior of HR mothers, suggesting a "too good mother" (Winnicott, 1957) speaking on child's behalf. Yet, HR mothers may be attempting to help infants overcome the adverse impact of genetic vulnerability by enhancing their learning.
- Future Directions:
  - Focusing on the social interaction between mother and child could be an attempt to investigate what may mediate any development or alteration in infants' development of ASD
  - Yet, MM as a construct would merit careful investigation, thought, and expansion when applied to vulnerable samples such as HR infants for ASD
  - Follow up studies of MM and maternal discourse, with child language and social- comm. scores, and ASD diagnosis at 18, 24, 36 months

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