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# EFFECTS OF MOOD AND EMPATHY ON THE PERCEPTION OF EMOTION IN PHOTOGRAPHIC FACES

Justin P. Madigan
*Northern Michigan University*

EFFECTS OF MOOD AND EMPATHY ON THE PERCEPTION OF EMOTION IN
PHOTOGRAPHIC FACES


By


Justin P. Madigan





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SIGNITURE APPROVAL FORM

This thesis by Justin P. Madigan is recommended for approval by the student's thesis committee in the Department of Psychology and by the Dean of Graduate Studies.

_____

Committee Chair:  Dr. Bradley Olson                                    Date

_____

First Reader:  Dr. Sheila Burns                                        Date

_____

Second Reader:  Dr. Timothy Hilton                                     Date

_____

Department Head:  Dr. Sheila Burns                                     Date

_____

Dean of Graduate Studies:  Dr. Terrance Seethoff                       Date

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Justin P. Madigan                                                        June 9th, 1981

ABSTRACT

EFFECTS OF MOOD AND EMPATHY ON THE PERCEPTION OF EMOTION IN
PHOTOGRAPHIC FACES


By

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This study examines the effects of mood and empathy on the perception of
emotion in photographic faces.  Davis's (1980) Interpersonal Reactivity Index was used
to obtain trait empathy scores for participants in part 1 of the study.  Part 2 used
Autobiographical Recall to induce a sad, neutral or happy mood.  Participants were then
asked to rate the level of emotional expressivity present in each photo presented on an
eleven point scale.  Three separate photo sets (sad, neutral, happy) were made up of 5
photos each.  A 3x2x3 mixed model ANOVA was used to analyze emotional intensity
ratings.  No statistically significant results were obtained.  However, mean scores for high
empathy individuals indicated that these participants saw less emotional expressivity in
photos for all three photo sets.  These results are similar to those of clinically depressed
patients and give evidence for a potentially strengthened model for studying depression
experimentally within a laboratory setting.

ACKNOWLEDGMENTS

I would like to thank my thesis chair Dr. Bradley Olson for his time, support, and great insight into social psychological research.  I would also like to thank committee member and Department Head, Dr. Sheila Burns for all her support and patience throughout. Additionally, I would like to thank Dr. Timothy Hilton for his time and commitment.

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This thesis follows the format prescribed by the *APA Style Manual* and the Department of Psychology.

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INTRODUCTION


Through a growing body of research on empathy (Caruso & Mayer, 1998; Davis,

1980; Dymond, 1949; Kunyk & Olson, 2001; Mehrabian, 1978; Mehrabian, Young, &

Sato, 1988; Wiseman, 1996) it is known that individuals vary in their levels of empathic

response. Several different studies (Caruso & Mayer, 1998; Davis, 1980; Mehrabian &

Epstein, 1972) using empathy scales illustrate these differences. Another aspect of

empathic response is the dynamic state of mood. This research will look at the

interaction between empathy as a trait and the dynamic state of mood on perceived

intensity of emotion faces in photographic faces.


*Facial Expressions*

Interest in facial expressions and face perception began to build after Johann

Caspar Lavater published his essays titled: *Physiognomy* in 1772(Graham, 1961).

Physiognomy is the study of human character from the face. Although Physiognomy is

not widely accepted or practiced today, interest in it remains.

Lavater influenced Charles Darwin. Darwin (1913) popularized the study of

facial expressions and emotion with his book *The Expressions of the Emotions in Man

and Animals.* Darwin argued that certain expressions of emotion were directly

associated with certain states of mind. Darwin also stated that a change in state of

mind would reflect an all-together different expression of emotion. Darwin's *The

Expressions of the Emotions in Man and Animals* (1913) details largely evolutionary

and biological differences in expressed emotion but this initial idea, that the expression of emotion is tied directly to the state of mind, is very powerful.

Ekman, Sorenson, & Friesen (1969) established a theory for universality of facial expression in the six basic emotions: anger, happiness, surprise, fear, disgust, and sadness.  When Ekman traveled to New Guinea and read emotionally based stories to the South Fore, a preliterate tribe, support for the theory was found.  The South Fore were then asked to match the emotions expressed in the stories with facial expressions.  There was no significant difference between response rates of the South Fore and response rates of American subjects.

Ekman, Friesen, and Tomkins (1971) used the term *display rules* to describe socially learned techniques that manage and control facial appearance.  The difference in display rules explains cultural differences in the frequency of expression of certain emotions in certain social contexts.  Before the Ekman et al. study it was argued that cultural differences in the expression of emotion were proof that there were no innate characteristics involved with facial expressions and the display of emotion (Ekman, 1989).

Each of the six basic emotions can be seen as triggering different neuro-muscular responses that result in the differing facial expressions for each emotion (Ekman et al., 1971).  The display of an emotion-dependent, facial expression is referred to as *encoding*, where as an observer's interpretation of this display is known as *decoding*.  When there is an error in decoding an expression it can often be attributed to affect blending that occurs in the encoding process. Affect blending is when a facial expression contains components of more than one emotion.

Current research in the field of social neuroscience (Harmon-Jones & Winkielman, 2007) has found differing physiological correlates for brain regions involved with face perception and perception of emotion in faces. Many of studies involve the use of advanced neuroimaging techniques such as functional magnetic resonance imaging (Davidson, Saron, Senulis, Ekman, & Friesen, 1990; Haxby, Hoffman, & Gobbini, 2000; Phillips et al., 1998; Vuilleumier & Pourtois, 2007) or electroencephalography (Achaibou, Pourtois, Schwartz, & Vuilleumier, 2008) to identify localized activity in different brain regions as a response to faces in general as well as responses to differing emotion in faces. This research is being done on humans as well as other primates such as monkeys and apes.

*Mood*

Mood is defined as a conscious state of mind or predominant emotion, a prevailing attitude, or a receptive state of mind predisposing to action (Merriam-Webster Dictionary, 2010). Perception of another's mood state has been shown to interact with an individual's likelihood to engage in helping behavior (Clark, Powell, Ouellette, & Milberg, 1987). Perception of mood in an individual requires some empathic abilities as implied by Dymond's definition of empathy (Clark et al., 1987; Dymond,1949). This study looks at the interplay between empathy, mood, and the perception of emotional photographic stimuli.

*Effects of Mood*

*State Dependent Learning*

Research has shown (Bower, 1981) that mood has a strong effect on memory. This was initially shown in a study were mood was induced by hypnotic mood induction.

After the initial mood induction subjects were asked to memorize word lists. After this initial memorization and brief waiting period hypnotic based mood induction was again used to either induce the subject with the same mood or differing mood from the initial memorization task. Subjects where the same mood was induced performed significantly better in the recall task than did subjects induced with a differing mood.

Mood's effects on learning were also shown in the recall of personal events (Bower, 1981). Subjects were asked to keep a journal where they would write down every emotional incident over the course of a week. After one week the subjects were asked to submit there journals. Subjects were then placed in a hypnotically induced mood state (happy or sad). Subjects were asked to recall all of the events that occurred over the past week. Subjects that were in the happy induced mood state recalled significantly more happy events. Subjects in the sad induced mood state recalled significantly more sad events (Bower, 1981).

*Mood and Perception of Pain*

Weisenberg, Raz, and Hener (1998) showed that mood can influence pain tolerance. Investigators used film based mood inductions to induce happy, sad, and neutral mood states. Another independent variable was length of film induction. Subjects would be placed randomly in one of the three mood state inductions. The film types used were: (1) humorous, (2) holocaust, (3) neutral. These inductions then varied in time (15 min, 30 min, and 45 min.). Baseline measurements of the cold-pressor pain test were given before, immediately after, and 30 min after. Results indicated that individuals in the humor mood induction had an increased pain tolerance. Individuals in the 45 min

inductions had increased pain tolerance regardless of induction condition when doing the cold-pressor pain test 30 min after induction.

*Mood and Face Perception*

It has been shown (Schiffenbauer, 1974) that mood state has effects on how we perceive emotion in faces. Schiffenbauer found that a subject's own emotional state exerted strong effects on their perception of the emotional state in others. The study also found that when the subjects own mood state matched the mood state of the facial expression being observed, it led to increased ratings of emotion in these faces.

Musically induced mood state has also been shown (Bouhuys, Bloem & Groothuis, 1994) to effect perception of emotion in faces. A study of 24 individuals in the Netherlands revealed that subjects in a musically induced depressed mood state saw more sadness in ambiguous photos (photos containing affect blends) than did subjects in a musically induced elated mood state. These same subjects saw less happiness in clear photos (photos where the emotion being expressed is clearly presented).

*Mood Induction Techniques*

The study of mood as an independent variable in the laboratory has never been an easy task. Because of the dynamics of mood states, mood shift can occur within seconds. This means that during any mood study a mood state could be missed altogether. Certain mood induction techniques have made the study of mood in the laboratory a more reliable procedure (Lubin, 1980; Martin, 1990).

One study (Martin, 1990) examined 16 different mood induction techniques. These include: self-statement, music, incremental music, hypnotic suggestions, facial expression, game feedback, social feedback, solitary recollection, social recollection, autobiographical recall, imagery, empathy, experimenter behavior, film, threat and public speaking. Of these 16 techniques examined certain techniques had more success inducing the desired mood than others. The hypnotic suggestion technique successfully induced the desired mood only 15 percent of the time. Other techniques had much higher success rates. The autobiographical recall technique induced the desired mood 75 percent of the time.

Lubin (1980) revealed that autobiographical recall was the superior induction technique when compared to structured sets of mood statements. Results were measured by the subjects responses to two depression measures and one anxiety measure following each of the inductions. Each subject was subjected to a depression-related mood induction, a control, and a elation-related mood induction.

Another study on the effectiveness of the autobiographical recall induction method revealed significant increases in depression and anxiety when subjects where in the condition where they recalled sad events as opposed to the control (Baker & Guttfreund, 1993). Subjects that were asked to recall happy events also showed significant decreases in depression when compared to the control.

*Empathy*

It is generally believed there are at least two distinct definitions of empathy (Meharabian, Young, & Sato, 1988). These two main types are cognitive empathy and

emotional empathy.  cognitive empathy is defined as the ability to imaginatively take the role of another and understand and accurately predict that person's thoughts, feelings and actions (Dymond, 1949).  Emotional empathy is defined as an individual's vicarious emotional response to perceived emotional experiences of others (Mehrabian & Epstein, 1972).  Measures of empathy are most often measured by the use of self-reporting and physiological indicators.

Empathy has been defined as both a state and trait characteristic (Papadatou, 1997). As a trait empathy is seen as a characteristic that varies between individuals, as a state empathy is a characteristic that varies within the individual (Nezlek, Feist, Wilson, & Plesko, 2001).  Regardless of whether we are speaking of cognitive versus emotional empathy or empathy as a trait vs. empathy as a state it is important to realize that empathy is one of the main components in understanding others as well as objects in our social world.  Kunyk & Olson (2001) state, "If understanding our clients, their needs, their emotions and their circumstance, is fundamental to nursing practice, and empathy is the foundation of that understanding, then a conceptualization of empathy that can be used by nurses is of utmost importance to the profession."  The fact is that a conceptualization and understanding of empathy is important to all professions.

*Sex Differences in Empathy*

Eisenberg and Lennon (1983) published meta-analyses of several of studies on empathy.  Their finding suggested that sex differences in empathy were a function of the methods used to assess empathy. They found that there are large sex differences in empathy favoring women when the method of assessment is self-report scales.  They also

found that there are no sex differences when the measure was either physiological or observations of nonverbal reactions to another's emotional state.

*Other Differences in Empathy*

Higher levels of empathy are associated with increased levels of helping behavior (Eisenberg-Berg and Mussen, 1978), higher levels of arousability (Mehrabian, 1977), higher levels of weeping (Williams, 1982), higher likelihood of engaging in pro-social behavior (Rushton et al., 1981) and lower levels of aggressive behavior (Mehrabian & Epstein, 1972). Knowing empathy plays a role in all the processes mentioned above it is important to examine whether or not empathy plays a role in our perception. Whether or not an individual's level of empathic response is related to the perceived intensity of emotional faces in photographic stimuli will be examined.

*Rationale for the Present Study*

Clark et al., (1949) indicate that the perception of mood in an individual requires some empathic abilities. Literature on both mood and empathy indicate a relationship between the two variables (Clark et al., 1987; Dymond,1949). The relationship between mood and empathy and their effects on the perception of emotion in faces has yet to be examined. The present study expands upon past research on facial expression and the perception of emotion in faces.

Clinically diagnosed individuals with Major Depressive Disorder have been shown to see less emotional expressivity in photos (Joorman & Gotlib, 2006). The

present study tests and potentially expands upon an experimental model of depression where a depressed/sad mood state is induced by autobiographical recall.

It is hypothesized that differences in mean ratings of emotional expressivity will be seen for each of the photo sets. Differences in ratings of emotional expressivity are also expected for level of empathy, and mood condition (sad, happy, or neutral), as well as differences due to the interaction of the two variables.

METHODS

The present study examines the effects of mood, and empathy on perception of emotional photographic stimuli. The study has two parts. Part one consists of the administration of the Interpersonal Reactivity Index. Part two consists of the randomized mood induction and the intensity rating of the emotion expressed in the emotional photographic stimuli.

*Instruments*

   *Autobiographical Recall Mood Induction*

The instructions for the three different Autobiographical Recall (Baker & Guttfreund, 1993; Lubin, 1980; Martin, 1990) mood conditions are as follows:

Think of three autobiographical mood evoking events, each of which became progressively sadder or more unpleasant. These should be events that caused you to feel lonely, rejected, defeated or hurt. You will have ten minutes to think and write about these events. You will not be able to advance until the end of the ten minute period. Take your time thinking and reflecting upon each event. Add all the detail you can provide within this ten-minute period.

Think of three autobiographical mood evoking events, each of which becomes progressively happier. These should be events that caused you to feel on top of the world, like you had everything going for you. You will have ten minutes to

think and write about these events.  You will not be able to advance until the end of the ten-minute period.  Take your time thinking and reflecting upon each event.  Add all the detail you can provide within this ten-minute period.

List three professions you would enjoy doing and three professions you would not enjoy doing. You will have ten minutes to think and write about these professions.  You will not be able to advance until the end of the ten-minute period.  Take your time thinking and reflecting upon each choice.   Add all the detail you can provide regarding each choice (why you would or would not like it) within this ten-minute period.

*Interpersonal Reactivity Index*

The Interpersonal Reactivity Index is a multidimensional measure of empathy (Davis, 1980).  Permission for use of the IRI was obtained from the creator, Mark Davis and is located in Appendix A.  The index has four subscales and each subscale is composed of 7 questions.  The four subscales are: perspective-taking, fantasy, empathic concern, and personal distress.  The perspective-taking scale measures the individual's ability to adopt the perspectives of others as well as their ability to see things from another's point of view.  The fantasy scale measures an individual's ability to identify with characters in movies, novels, plays and other fictional situations.  The empathic concern scale measures an individual's ability to feel warmth, compassion, and concern for others.  The personal distress scale measures the individual's feelings of anxiety and discomfort that result from observing another's negative experience.  The perspective-taking and fantasy subscales can be seen as measures of cognitive empathy while the

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empathic concern and personal distress subscales can be seen as measures of emotional empathy.

The four subscales were supported by separate factor analyses conducted on data for male and female individuals. The alpha coefficients for each subscale by gender are: perspective-taking (.75, .78), fantasy (.78, .75), empathic concern (.72, .70) and personal distress (.78, .78) (Davis, 1980).

*Procedure*

The present study was approved by Northern Michigan University's IRB in the fall of 2008 (#HS08-202, Appendix F). The Interpersonal Reactivity Index (Davis, 1980), and the Autobiographical Recall mood induction procedure were adapted for online use using Qualtrics Survey Software. The study was divided into two parts to avoid any experimenter effect associated with following the IRI with the emotional expressivity rating task. Participants were college age students. Part two of the study was controlled for by sex, insuring an equal sample of male and female participants in each of the mood induction conditions. Mood induction condition was randomized.

*Task*

*Part One*

Part one of the experiment was done prior to and independent of part two. Two hundred and eighty nine participants completed the Interpersonal Reactivity Index. Participants were asked to give their school user name so that their data could be paired with an experiment at a later date. Students were asked for permission to use these

results in conjunction with part two. Results were scored in accordance with the scoring procedures (Appendix B) for the Interpersonal Reactivity Index as outlined by Davis (1980).

*Part Two*

Participants signed up to participate by time period and were randomly assigned to either of the three induction conditions (happy, sad, or neutral). After completing their randomly assigned mood induction subjects are shown a set of 15 emotionally expressive faces. The faces were taken from Ekman and Friesen (1976) *Pictures of Facial Effect* photo set. The photo set was purchased from the Paul Ekman Group. There were five sad, five happy, and five neutral photos presented. Each photo was presented one at a time to the subject. The participant was asked to indicate whether the photo was of a happy, sad, or neutral face. Participants where then asked to indicate the intensity of the emotion expressed in the photo on an 11 point scale ( 1 being low intensity and 11 being high intensity).

RESULTS

Out of the 60 participants in part two of the study 10 were eliminated due to consistent errors in identifying the emotion presented in the photos. The criteria for elimination were more than three wrongly identified photos or less than 80 percent correctly identified.

Of the 50 remaining subjects, 27 had participated in part one of the study and their interpersonal reactivity index results were added to the cumulative data.

The participants were given a total empathy score as a result of the scoring procedures for the Interpersonal Reactivity Index. The intensions of the study were to assess possible differences in perception of emotional photographic faces based on differences in empathy (high vs. low) and differences in mood (sad, neutral, and happy) in college students.. The empathy total score variable was broken into quartiles. The lower quartile (55 and under) were coded as "1". The upper quartile (74 and above) were coded as a "2". Of the 27 participants with empathy scores 15 of these fell within the lower and upper quartiles and were included in this new variable (8 participants in the low and 7 in the high).

Previous research has established gender differences in trait and state levels of empathy (Burns & Cavey, 1957; De Fruyt, 1997; Eisenberg & Lennon, 1983; Hamann & Canli, 2004; Rueckert & Naybar, 2008). Due to these potential differences we ran a bivariate correlation to rule out gender differences in our high versus low empathy variable. The correlation coefficient failed to reach significance, $r(15) = .218$, $p > .05$.

The emotional intensity ratings were analyzed in a 3 x 2 x 3 mixed design ANOVA, in which mood induction condition (sad, happy, or neutral) served as a between subjects variable as well as level of empathy (high versus low). Photo set (sad, neutral, and happy) served as the within-subjects variable. Mauchly's test of sphericity indicated that sphericity could not be assumed. A Greenhouse-Geisser correction was used and can be seen in Table 1. The main effect of the photo set within-subject group (Table 1) did reach significance, $\underline{F}(1.274, 11.466) = 33.367$, $\underline{MSE} = 124.562$, $p < .05$. No significant main effects or interactions were found in between subjects' analyses (Table 2).

Within-subject significance for photo set shows that subjects' did in fact recognize 3 clearly different sets of photos (sad, happy, neutral). This significance serves as a variable check for photo set.

Although results of the current study failed to reach significance Figures 1-7 indicate a potential trend. A replication of the study may be warranted. An increase in sample size and power is recommended.

Table 1: Mixed design ANOVA within-subject effects.

| Source | | Type III Sum of Squares | df | Mean Square | F | Sig. | Observed Power[a] |
|---|---|---|---|---|---|---|---|
| PhotoSet | Sphericity Assumed | 158.697 | 2 | 79.349 | 33.367 | .000 | 1.000 |
| | Greenhouse-Geisser | 158.697 | 1.274 | 124.562 | 33.367 | .000 | 1.000 |
| PhotoSet * highlowempathy4 | Sphericity Assumed | 3.300 | 2 | 1.650 | .694 | .512 | .149 |
| | Greenhouse-Geisser | 3.300 | 1.274 | 2.590 | .694 | .456 | .126 |
| PhotoSet * Condition | Sphericity Assumed | 7.236 | 4 | 1.809 | .761 | .564 | .198 |
| | Greenhouse-Geisser | 7.236 | 2.548 | 2.840 | .761 | .519 | .158 |
| PhotoSet * highlowempathy4 * Condition | Sphericity Assumed | 11.940 | 4 | 2.985 | 1.255 | .324 | .313 |
| | Greenhouse-Geisser | 11.940 | 2.548 | 4.686 | 1.255 | .330 | .238 |
| Error(PhotoSet) | Sphericity Assumed | 42.804 | 18 | 2.378 | | | |
| | Greenhouse-Geisser | 42.804 | 11.466 | 3.733 | | | |
| a. Computed using alpha = .05 | | | | | | | |

Table 2: Mixed design ANOVA between subject effects.

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared | Observed Power[a] |
|---|---|---|---|---|---|---|---|
| Intercept | 1174.333 | 1 | 1174.333 | 278.555 | .000 | .969 | 1.000 |
| Condition | .003 | 2 | .001 | .000 | 1.000 | .000 | .050 |
| high versus low empathy | 1.573 | 1 | 1.573 | .373 | .556 | .040 | .085 |
| Condition * high versus low empathy | 8.515 | 2 | 4.257 | 1.010 | .402 | .183 | .175 |
| Error | 37.942 | 9 | 4.216 | | | | |

Figure 1: Depicts mean ratings of emotional expressiveness for sad photos. High empathy versus low empathy individuals is shown on the X-axis. Separate lines show the mood induction condition.

**Mean Ratings of Emotional Expressivity in Neutral Photos as a Function of Mood and Empathy**
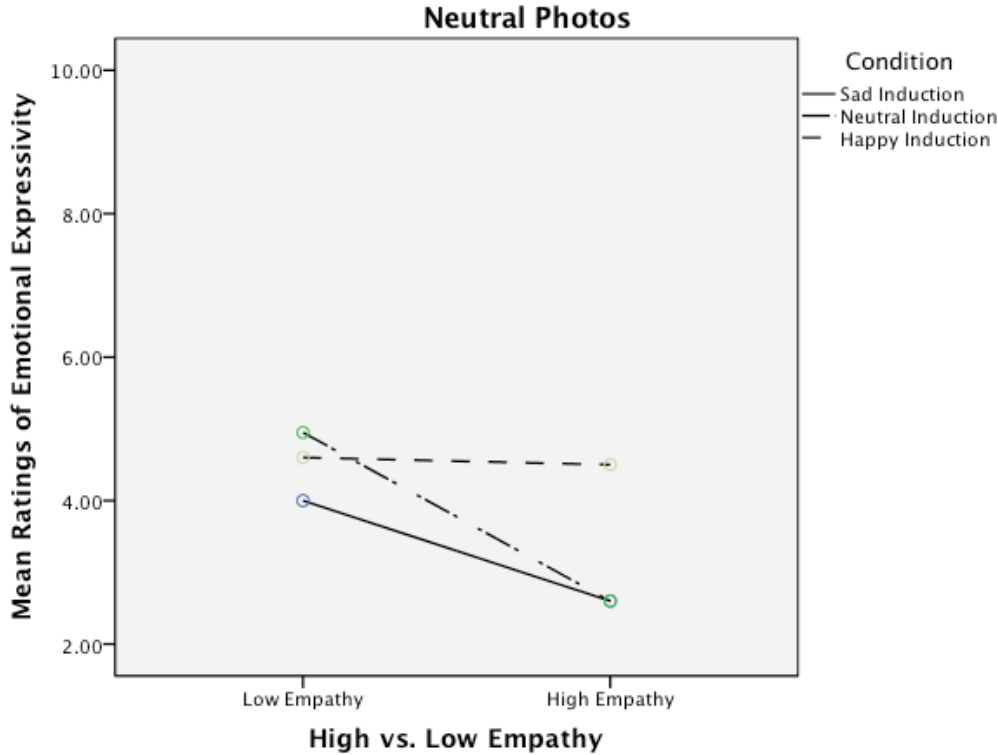
Figure 2: Depicts mean ratings of emotional expressiveness for neutral photos. High empathy versus low empathy individuals is shown on the X-axis. Separate lines show the mood induction condition.
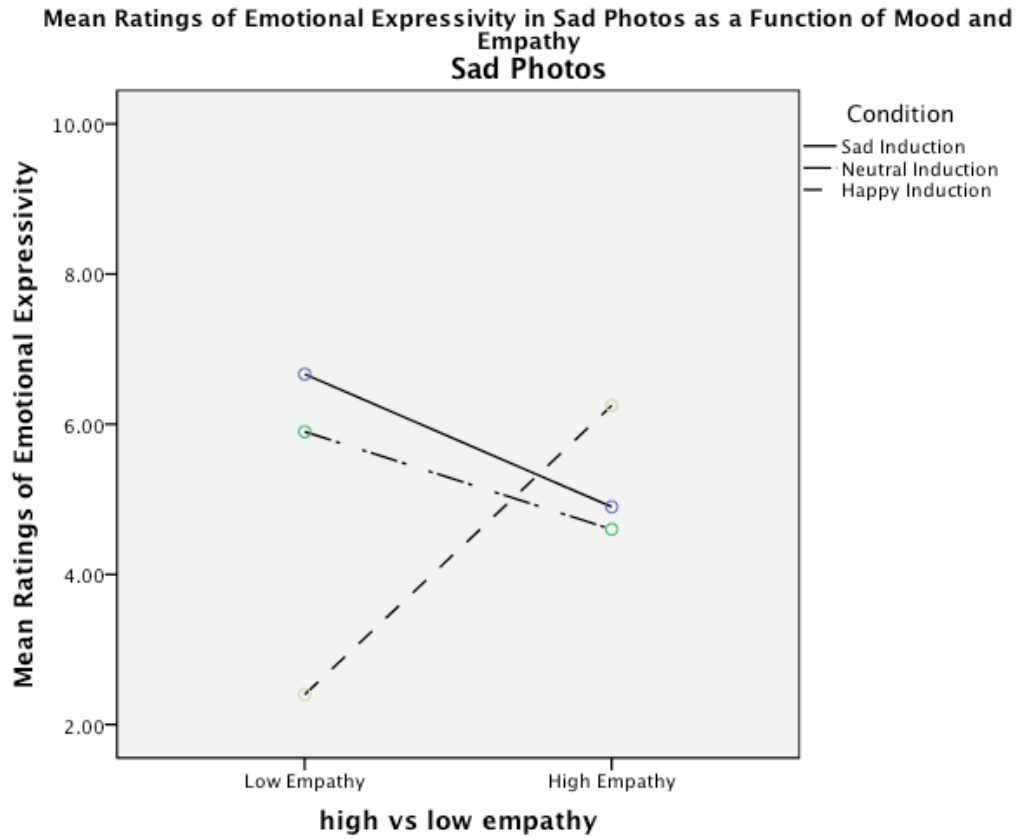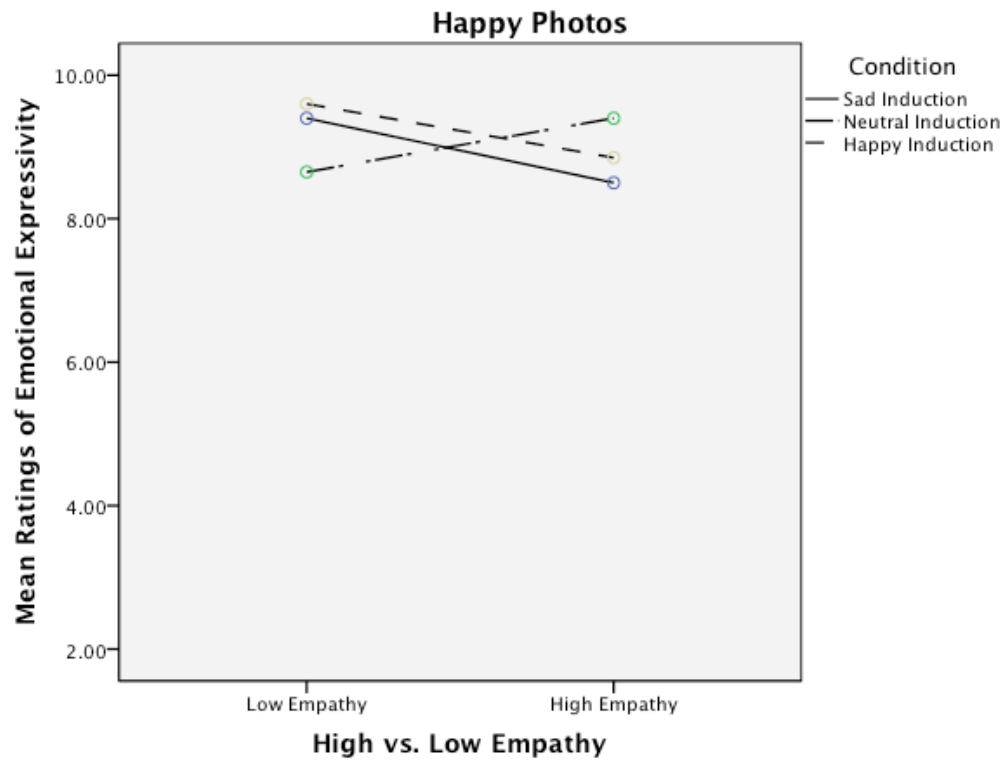
Figure 3: Depicts mean ratings of emotional expressiveness for happy photos. High empathy versus low empathy individuals is shown on the X-axis. Separate lines show the mood induction condition.

**Ratings of Emotional Expresivity for Participants in Sad Mood Induction as a Function of Photo Set and Empathy**
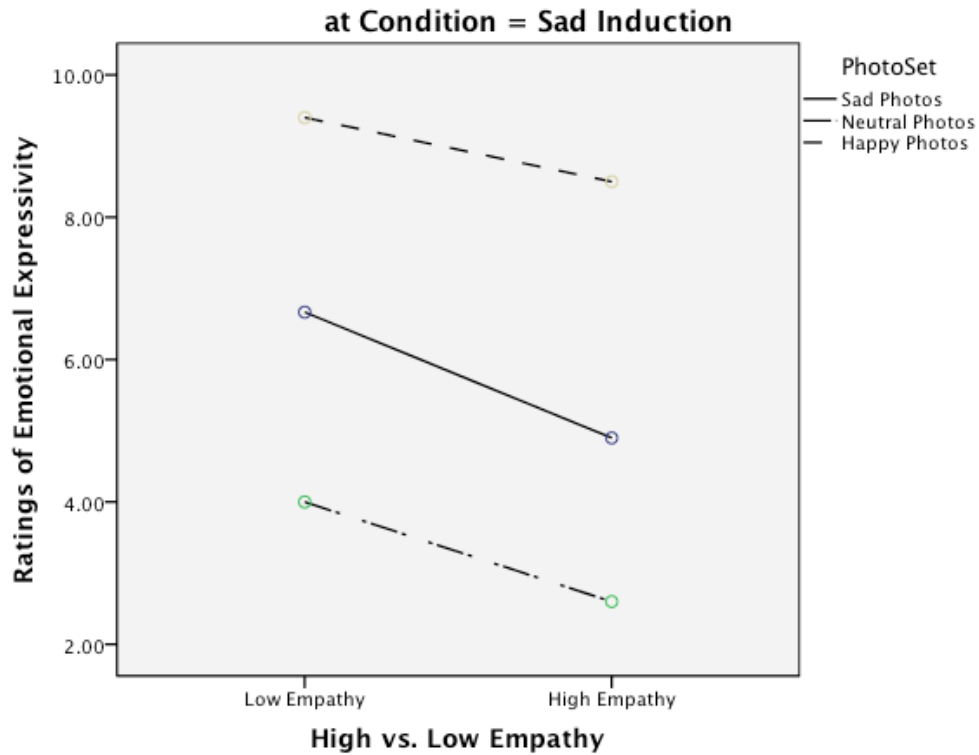
Figure 4: Depicts mean ratings of emotional expressiveness for the sad mood induction condition. High empathy versus low empathy individuals is shown on the X-axis. Separate lines show the photo set (1 = sad, 2 = neutral, 3 = happy).
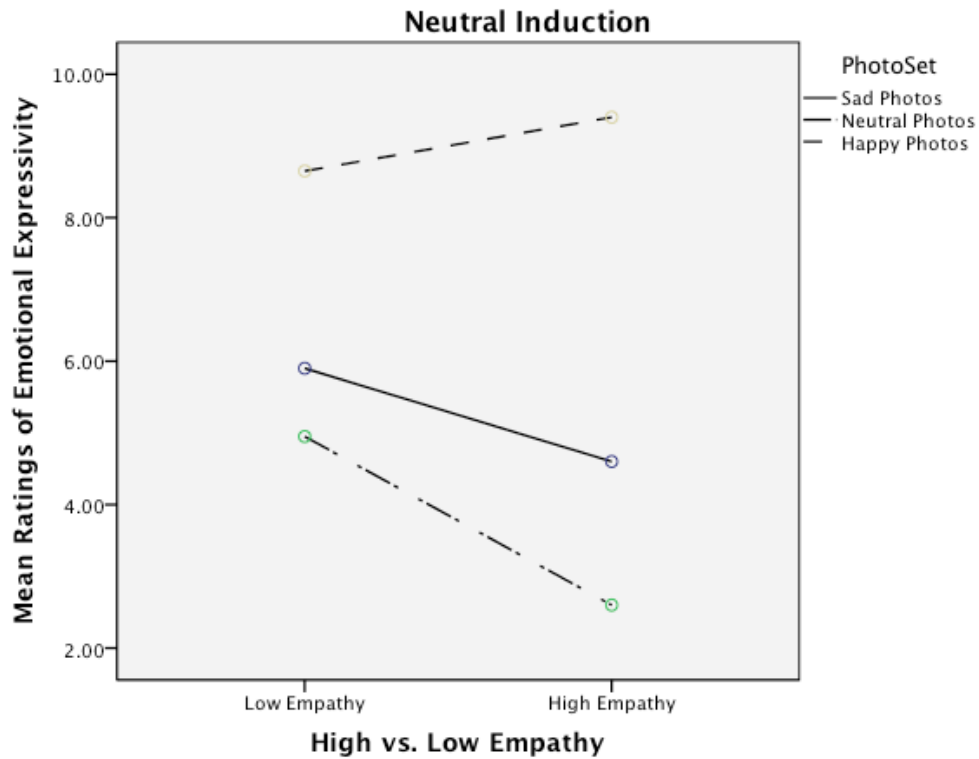
Figure 5: Depicts mean ratings of emotional expressiveness for the neutral mood induction condition. High empathy versus low empathy individuals is shown on the X-axis. Separate lines show the photo set (1 = sad, 2 = neutral, 3 = happy).

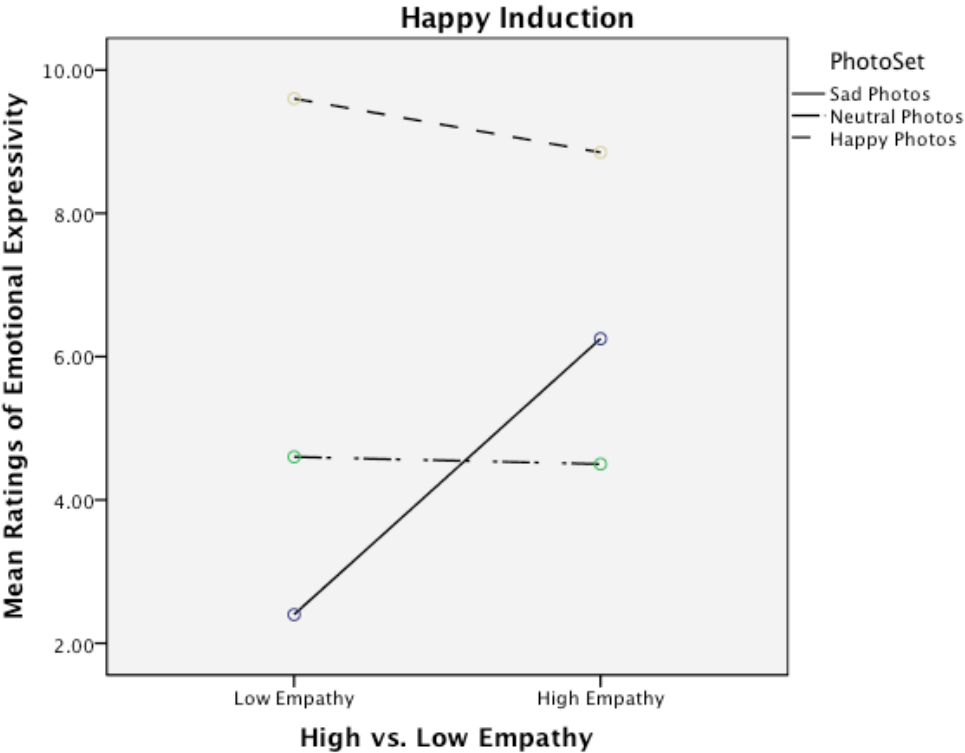Figure 6: Depicts mean ratings of emotional expressiveness for the happy mood induction condition.  High empathy versus low empathy individuals is shown on the X-axis. Separate lines show the photo set (1 = sad, 2 = neutral, 3 = happy).
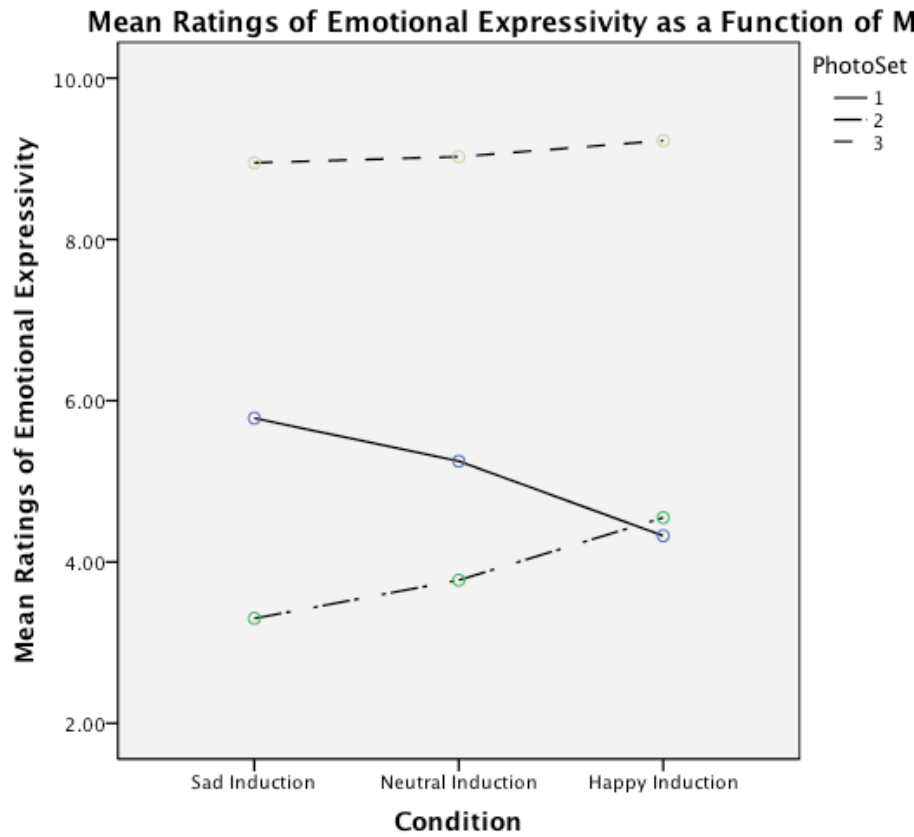
Figure 7: Depicts mean ratings of emotional expressiveness dependent on mood. Mood induction condition is shown on the X-axis. Separate lines show the photo set (1 = sad, 2 = neutral, 3 = happy).

DISCUSSION

It is clear from the literature that differing levels of empathy as well as mood state effect perception and behavior (Bouhuys et al., 1994; Burns & Cavey, 1957; Clark, Powell, Ouellette, & Milberg, 1987; De Fruyt, 1997; Eisenberg & Lennon, 1983, Jackson et al., 2004; Marsh et al., 2007; Meharabian, 1978; Nezlek, Feist, Wilson, & Plesko, 2001; Rushton, 1986; Schiffenbauer, 1974; Thibodeau, Jorgensen, & Jonovich, 2008; Weisenberg et al., 1998). This study examined whether or not mood and empathy have an effect on the perception of emotion in photographic stimuli. Although the results of the study failed to reach significance further research is needed to truly establish the effect of both mood and empathy on the perception of emotion in faces.

This study was not without its flaws. An initial power analysis indicated that a sample size of 60 would be needed to obtain a power of .8. This initial analysis was done under the assumption that empathy scores would be obtained for all participants within the study. Because the study was given in two parts this turned out to not be the case. Only 33 of the 60 participants had empathy scores. The total number of participants with empathy scores was further reduced to 27 when subjects were removed due to repeated errors identifying the emotion presented in the photographic stimuli.

Because the study was looking at potential differences between levels of empathy (high versus low) our total subjects were further reduced with the creation of the "high versus low" empathy variable. This reduction was necessary in order to examine potential differences in subjects with higher or lower levels of trait empathy but also contributed to

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the studies low levels of power (.05 for mood induction effects, .085 for empathy effects, and .175 for interaction effects).

In an attempt to increase power, the data were also examined under several different arrangements:

*Tertiles*

Empathy scores were broke into tertiles rather than quartiles and subjects falling with in the uppermost tertile made up the "high empathy" group while subjects falling within the lowest tertile made up the "low empathy" group. Breaking the "high versus low" empathy variable into tertiles raised the number of subjects from 8 to 9 in the low empathy group and from 7 to 9 in the high empathy group. This in return slightly raised power (.121 for mood induction effects, .074 for empathy effects, and .354 for interaction effects). Although there was an increase in power there were still no significance in main effects or interaction effects.

*Remove Ambiguous Photos*

The initial analyses removed individual subjects if they misidentified 3 or more photos. Rather than removing these subjects we ran analyses were we removed ambiguous photos where less than 75 percent of subjects correctly identified the emotion expressed in the photographic stimuli. By removing ambiguous photos there were 9 subjects in the low empathy group and 10 subjects in the high empathy group. Overall, observed power remained low (.1 for mood induction effects, .051 for empathy effects, and .106 for interaction effects). There were no significant between subject effects or interactions.

*Remove Erroneous Responses*

The data were also analyzed by removing each erroneous response to a photo. This allowed us to keep all photos as well as all subjects included in the data set. This change did not increase the number of subjects in the high and low empathy groups. Observed power remained low (.082 for mood induction effects, .05 for empathy effects and .079 for interaction effects). There were no significant results for any between subject effects or interactions.

*Tri-Median Split*

Finally a tri-median split of empathy scores was performed. This split of the data included high, middle, and low levels of empathy and left all subjects with empathy scores in the analyses. This design slightly increased observed power for detecting an interaction effect (.421), but overall power remained low (.087 for mood induction effects, and .113 for empathy effects). There were no significant results for any between subject effects or interactions.

Due to the lack of observed power in the study more research is needed to determine the relationship between level of trait empathy and mood state and their potential effects on the perception of emotion in photographic stimuli. Suggestions for improved power in future studies would be: increase sample size and combine part 1 and part 2 of the study (ensures empathy scores are collected for all subjects).

*Facial Expressions*

When studying the expression of emotion in faces the photoset used is of great importance. This study used Ekman's (1976) *Pictures of Facial Affect.* This photo set

had already been tested and shown to be reliable and valid. Even with the use of a reliable photo set errors occurred. There were notable affect blends in 2 of the neutral photos and 1 of the sad photos that were chosen. It is advisable to avoid photos that contain affect blends when the goal of the research is to examine subjects' response to a clearly presented and specific expression of emotion. Affect blends within photos are advisable and even necessary when studying subjects' response to ambiguously presented expressions of emotion as was done in Bouhuys's (1994) study.

*Mood Induction Task*

Further research should consider randomized single subject administration of the study as opposed to administering it in randomized groups. Due to the sensitivity of the mood induction task, group environments may not be the most conducive to successful inductions. Group settings accommodate for numerous occurrences that can break the induction such as: late arrivals, asking questions, and participants speaking with other subjects during the study. Single subject administration appears to be the only way to avoid these distractions and best ensure a successful mood induction.

One to two variable checks should also be implemented in future studies to assess the success of the mood induction task. This study failed to account for the subjects' mood before the task began and did not ask the subject their mood immediately following the induction.

*Mood*

Bower's (1981) original research on mood's effects on memory and learning has shown that mood state is very powerful and has strong effects on the mind. Mood has been shown to also exhibit significant effects on the perception of pain. Weisenberg's (1998) study showed humor-induced mood states led to significantly increased pain tolerance. Knowing that mood effects the perception of pain it is important to know whether or not it has similar effects on the perception of emotion in other individuals.

Mood has also been shown to effect the perception of emotion expressed in faces. Schiffenbauer (1974) showed that individuals that share a mood state with an observed photo rate those photos as being more emotionally expressive than those photos that exhibit mood states that are dissimilar from their own. This study demonstrates differences in the perception of emotion in faces but also incorporates an aspect of empathy in its results. Do individuals see these faces as being more emotionally expressive because it is easier to empathize with them due to the sameness of their mood state? The results seem to indicate that this is so and give even more reason to pursue future research into the effects of mood as well as its interaction with empathy on the perception of emotion in faces.

Depressive state mood inductions have led to increased sadness ratings by subjects viewing ambiguous photos as well as decreased happiness ratings in photos where the emotion in the photo is presented clearly (Bouhuys et al., 1994). This research shows mood dependent differences in the perception of emotion in faces regardless of ambiguity (affect blend) in the photos presented. This gives evidence for broad effects of mood on the perception of emotion in faces that extends beyond an interaction between

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the mood state of an individual and a clearly depicted mood state expressed by a face in a photo.

*Empathy*

Due to effects empathy has been shown to exhibit in other research it would not be surprising to see it effect the perception of emotion in photographic faces.  We already know that individuals with higher levels of cognitive empathy have a heightened ability to perceive emotional states in others (Davis, 1980).  This finding is indicative of the potential perceptual influence of empathy.

Empathy has been shown to be multidimensional (Davis, 1980). Individuals scoring higher in any one of the dimensions of empathy are able to interpret emotion presented within the context of this dimension better than others with lower inter-dimension scores (Davis, 1980).  This brings together the possibility that there are potential differences in perception dependent on level of empathy as a whole as well as level of empathy within a specific dimension.

*Implications From Current Study*

Joorman and Gotlib (2006) showed that depressed patients saw less emotion in photos of facial expression than did non-depressed individuals. Bouhuys et al. (1994) had similar findings when inducing sadness in non-depressed participants.  Figure 7 from the present study shows participants in the sad mood induction seeing more sadness in all photo sets besides sad photos, and shows the effects of mood independent of level of

empathy.  When including empathy in the analysis (Figure 4), more sadness was seen in all the photo sets (sad, neutral, happy) by high empathy participants, as opposed to low empathy participants. This illustrates a potential interaction that occurs between mood state and empathy that has not been examined in previous research.

Understanding the relationship between mood and empathy in the perception of emotion in faces is pivotal for future research on empathy, mood, mood induction, and emotional intelligence.  Furthermore, research examining the relationship between mood, empathy and the perception of emotion in faces has the potential to create a new understanding in the link between perception of emotion and depression (Hale, 1998; Bouhuys, 1994).

If empathy can be seen as a vicarious response to another person's mood state and that person's mood state is directly tied to their expression, as Darwin (1913) suggested, it would seem that this vicarious response could in turn be tied to perception and be influenced by changes in mood state as well.  If this is so it is clear that empathy and mood are deeply intertwined.  Any future research on perception of mood should include potential interactions with level of empathy and vice versa.

**PERMISSION FOR USE OF INTERPERSONAL REACTIVITY INDEX**

| From: | Mark Davis [davismh@eckerd.edu] | | Sent: Thu 6/26/2008 12:09 PM |
|---|---|---|---|
| To: | jmadigan@nmu.edu | | |
| Cc: | | | |
| Subject: | Re: A Multidimensional Approach to Individual | | |

| ✉ Message | 📄 IRIword.doc | 📄 Davis (1980).pdf |
|---|---|---|
| | 📄 Measuring Individual Differences (1983).pdf | |

Dear Justin:

Thanks for your interest in the IRI.  You have my full permission to use the instrument in your research, and I am attaching a copy to this email, along with some articles that describe its development.  Please let me know if I can be of any further assistance, and best of luck with your project.

Regards,
Mark


Justin Madigan wrote:
>
> Dear Dr. Davis,
>
> I am currently a graduate student at Northern Michigan University.  I
> am interested in doing some research on empathy.  I have read your
> publication: A Multidimensional Approach to Individual Differences in
> Empathy.  Your scale seems to be exceptional and I think It would work
> perfectly for my research.  I was wondering if there would be a way
> that I could get the scale and permission from you to use it.  If you
> could get back to me at your convenience I would greatly appreciate
> it. Thank you for your help and your time.
>
>
>
> Justin P. Madigan

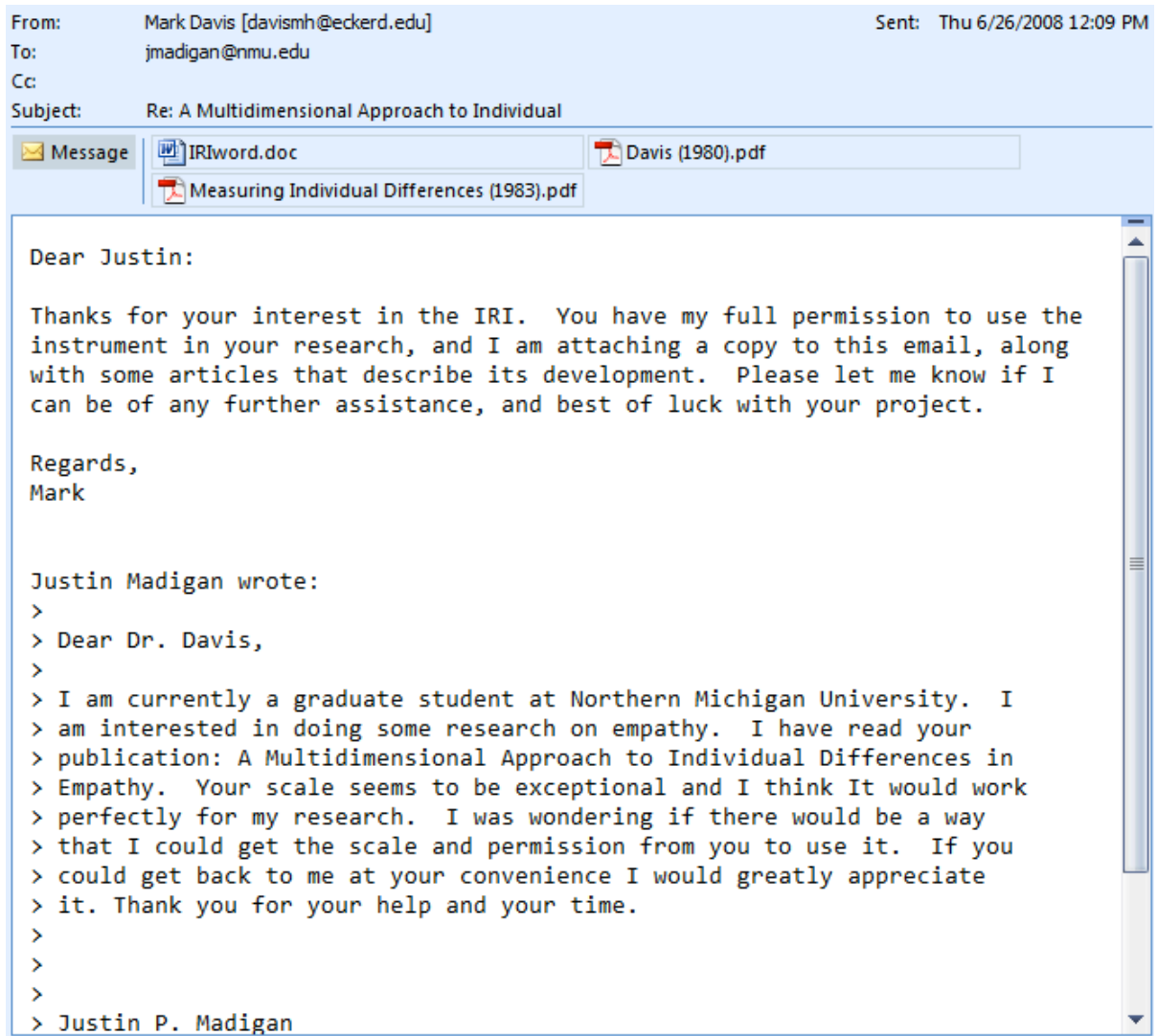Figure 8:  Permission for use of the Interpersonal Reactivity Index.

INTERPERSONAL REACTIVITY INDEX

The following statements inquire about your thoughts and feelings in a variety of situations.  For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page:  A, B, C, D, or E.  When you have decided on your answer, fill in the letter on the answer sheet next to the item number.  READ EACH ITEM CAREFULLY BEFORE RESPONDING.  Answer as honestly as you can.  Thank you.

ANSWER SCALE:

| A | B | C | D | E |
|---|---|---|---|---|
| DOES NOT | | | | DESCRIBES ME |
| DESCRIBE ME | | | | VERY |
| WELL | | | | WELL |

1.  I daydream and fantasize, with some regularity, about things that might happen to me. (FS)

2.  I often have tender, concerned feelings for people less fortunate than me. (EC)

3.  I sometimes find it difficult to see things from the "other guy's" point of view. (PT) (-)

4.  Sometimes I don't feel very sorry for other people when they are having problems. (EC) (-)

5.  I really get involved with the feelings of the characters in a novel. (FS)

6.  In emergency situations, I feel apprehensive and ill-at-ease. (PD)

I am usually objective when I watch a movie or play, and I don't often get completely caught up in it. (FS) (-)

8.  I try to look at everybody's side of a disagreement before I make a decision. (PT)

9.  When I see someone being taken advantage of, I feel kind of protective towards them. (EC)

10.  I sometimes feel helpless when I am in the middle of a very emotional situation. (PD)

I sometimes try to understand my friends better by imagining how things look from their perspective. (PT)

12.  Becoming extremely involved in a good book or movie is somewhat rare for me. (FS) (-)

13.  When I see someone get hurt, I tend to remain calm. (PD) (-)

14.  Other people's misfortunes do not usually disturb me a great deal. (EC) (-)

If I'm sure I'm right about something, I don't waste much time listening to other people's arguments. (PT) (-)

16.  After seeing a play or movie, I have felt as though I were one of the characters. (FS)

17.  Being in a tense emotional situation scares me. (PD)

When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
(EC) (-)

19.  I am usually pretty effective in dealing with emergencies. (PD) (-)

20.  I am often quite touched by things that I see happen. (EC)

21.  I believe that there are two sides to every question and try to look at them both. (PT)

22.  I would describe myself as a pretty soft-hearted person. (EC)

23.  When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)

24.  I tend to lose control during emergencies. (PD)

25.  When I'm upset at someone, I usually try to "put myself in his shoes" for a while. (PT)

When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me. (FS)

27.  When I see someone who badly needs help in an emergency, I go to pieces. (PD)

28.  Before criticizing somebody, I try to imagine how I would feel if I were in their place. (PT)

NOTE: (-) denotes item to be scored in reverse fashion
           PT = perspective-taking scale
           FS = fantasy scale
           EC = empathic concern scale
           PD = personal distress scale

           A = 0
           B = 1
           C = 2
           D = 3
           E = 4

Except for reversed-scored items, which are scored:

           A = 4
           B = 3
           C = 2
           D = 1
           E = 0

APPENDIX C

AUTOBIOGRAPHICAL RECALL QUESTIONS



Figure 9: Autobiographical recall questions as they appeared in the study.

EXAMPLE: PRESENTATION OF PHOTO DURING THE STUDY

**Q8** ☐ For the following questions please rate (on a scale of 1 to 11: 1 being the least intense and 11 being the most intense) the intensity of the emotion expressed by the individual in each photo. Regardless of the emotion expressed (Sad, Happy, Neutral) 11 would be the highest possible intensity rating.

**Q9** ☐

| | Low Intensity 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | High Intensity 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Emotional Intensity | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**Q10** ☐ Select the emotion expressed in the photo above.

○ Happiness

○ Sadness

○ Neutral

Figure 10: Example: Photos as presented during the study.

APPENDIX E

PICTURES OF FACIAL AFFECT: PHOTOS USED, DATA, & INFORMATION

Sad Photos:



Figure 11a: Sad photos taken from Ekman (1976) *Pictures of Facial Affect*.

Happy Photos:



Figure 11b: Happy photos taken from Ekman (1976) *Pictures of Facial Affect*.

Neutral Photos:



Figure 11c:  Photos taken from Ekman (1976) *Pictures of Facial Affect*.

Table 3. Per cent of Judgments of Each Emotion for Each Photograph*
(Based on 10 second exposures)

| Photograph No. | ID | Hap | Sad | Fear | Ang | Sur | Disg | Neu* |
|---|---|---|---|---|---|---|---|---|
| **Happy Photos** | | | | | | | | |
| 1 | A-1-06 | 100 | 0 | 0 | 0 | 0 | 0 | - |
| 7 | C-2-18 | 99 | 0 | 0 | 1 | 0 | 0 | - |
| 14 | EM-4-07 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | GS-1-08 | 96 | 0 | 0 | 0 | 4 | 0 | - |
| 29 | JB-1-09 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 34 | JJ-4-07 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | JJ-4-08 | 97 | 0 | 0 | 0 | 3 | 0 | 0 |
| 42 | JM-1-04 | 100 | 0 | 0 | 0 | 0 | 0 | - |
| 48 | MF-1-06 | 100 | 0 | 0 | 0 | 0 | 0 | - |
| 57 | MO-1-04 | 100 | 0 | 0 | 0 | 0 | 0 | - |
| 66 | NR-1-06 | 92 | 0 | 4 | 0 | 4 | 0 | - |
| 73 | PE-2-06 | 97 | 0 | 0 | 0 | 0 | 0 | 3 |
| 74 | PE-2-12 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 84 | PF-1-05 | 96 | 0 | 0 | 0 | 4 | 0 | - |
| 85 | PF-1-06 | 100 | 0 | 0 | 0 | 0 | 0 | - |
| 93 | SW-3-09 | 100 | 0 | 0 | 0 | 0 | 0 | - |
| 100 | WF-2-11 | 97 | 0 | 0 | 0 | 0 | 3 | 0 |
| 101 | WF-2-12 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sad Photos** | | | | | | | | |
| 2 | A-2-06 | 0 | 90 | 6 | 3 | 0 | 0 | - |
| 8 | C-1-18 | 2 | 90 | 5 | 1 | 0 | 2 | - |
| 15 | EM-4-24 | 0 | 97 | 0 | 0 | 3 | 0 | 0 |
| 23 | GS-2-01 | 0 | 71 | 3 | 13 | 0 | 13 | - |
| 36 | JJ-5-05 | 3 | 93 | 0 | 3 | 0 | 0 | 0 |
| 43 | JM-3-11 | 0 | 96 | 0 | 0 | 0 | 4 | - |
| 49 | MF-1-30 | 0 | 90 | 3 | 0 | 0 | 6 | - |
| 58 | MO-1-30 | 0 | 87 | 4 | 0 | 0 | 8 | - |
| 67 | NR-2-15 | 0 | 94 | 0 | 3 | 3 | 0 | - |
| 75 | PE-2-31 | 0 | 74 | 16 | 3 | 0 | 6 | - |
| 76 | PE-5-07 | 0 | 92 | 8 | 0 | 0 | 0 | - |
| 77 | PE-5-10 | 0 | 83 | 0 | 4 | 0 | 13 | - |
| 86 | PF-2-12 | 0 | 100 | 0 | 0 | 0 | 0 | - |
| 87 | PF-2-16 | 0 | 100 | 0 | 0 | 0 | 0 | - |
| 94 | SW-2-16 | 0 | 92 | 0 | 0 | 0 | 8 | - |
| 102 | WF-3-28 | 7 | 79 | 0 | 3 | 3 | 7 | 0 |
| 103 | WF-5-06 | 0 | 88 | 0 | 4 | 0 | 8 | - |
| **Fear Photos** | | | | | | | | |
| 9 | C-1-23 | 0 | 0 | 87 | 13 | 0 | 0 | - |
| 16 | EM-5-21 | 0 | 0 | 92 | 0 | 8 | 0 | - |
| 17 | EM-5-24 | 0 | 10 | 83 | 3 | 3 | 0 | - |
| 24 | GS-1-25 | 0 | 0 | 77 | 0 | 19 | 3 | - |
| 37 | JJ-5-13 | 0 | 4 | 96 | 0 | 0 | 0 | 0 |
| 50 | MF-1-26 | 0 | 4 | 87 | 0 | 8 | 0 | - |
| 51 | MF-1-27 | 0 | 0 | 83 | 0 | 17 | 0 | - |
| 59 | MO-1-23 | 0 | 0 | 88 | 0 | 13 | 0 | - |
| 60 | MO-1-26 | 0 | 0 | 88 | 8 | 4 | 0 | - |
| 68 | NR-1-19 | 0 | 10 | 84 | 0 | 3 | 3 | - |
| 78 | PE-3-16 | 0 | 0 | 91 | 2 | 7 | 0 | - |
| 79 | PE-3-21 | 0 | 0 | 92 | 4 | 4 | 0 | 0 |
| 88 | PF-2-30 | 0 | 0 | 100 | 0 | 0 | 0 | - |
| 95 | SW-2-30 | 4 | 0 | 79 | 0 | 8 | 8 | - |
| 104 | WF-3-16 | 0 | 4 | 88 | 0 | 4 | 4 | 0 |
| **Anger Photos** | | | | | | | | |
| 3 | A-1-14 | 0 | 3 | 0 | 97 | 0 | 0 | - |
| 10 | C-2-12 | 3 | 0 | 0 | 74 | 3 | 19 | - |
| 18 | EM-5-14 | 0 | 0 | 0 | 83 | 3 | 13 | - |
| 25 | GS-2-08 | 0 | 0 | 4 | 70 | 0 | 26 | - |
| 30 | JB-1-23 | 0 | 7 | 0 | 81 | 0 | 11 | 0 |

| Photograph No. | ID | | Hap | Sad | Fear | Ang | Sur | Disg | Neu* |
|---|---|---|---|---|---|---|---|---|---|
| **Anger Photos (Cont'd.)** | | | | | | | | | |
| 38 | JJ-3-12 | | 0 | 0 | 15 | 76 | 3 | 6 | - |
| 44 | JM-5-03 | | 0 | 4 | 4 | 92 | 0 | 0 | - |
| 52 | MF-2-05 | | 0 | 3 | 3 | 84 | 6 | 3 | - |
| 53 | MF-2-07 | | 0 | 0 | 0 | 100 | 0 | 0 | - |
| 61 | MO-2-11 | | 0 | 0 | 0 | 100 | 0 | 0 | - |
| 62 | MO-2-13 | | 0 | 0 | 0 | 96 | 0 | 4 | - |
| 69 | NR-2-07 | | 0 | 0 | 0 | 100 | 0 | 0 | - |
| 80 | PE-2-21 | | 0 | 3 | 0 | 83 | 7 | 7 | 0 |
| 89 | PF-2-04 | | 0 | 0 | 0 | 79 | 0 | 21 | - |
| 96 | SW-4-09 | | 0 | 0 | 0 | 100 | 0 | 0 | - |
| 105 | WF-3-01 | | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| 106 | WF-3-04 | | 0 | 0 | 2 | 96 | 0 | 2 | - |
| **Surprise Photos** | | | | | | | | | |
| 4 | A-1-24 | | 0 | 0 | 3 | 0 | 97 | 0 | - |
| 11 | C-1-10 | | 1 | 0 | 5 | 1 | 94 | 0 | - |
| 19 | EM-2-11 | | 3 | 0 | 0 | 0 | 91 | 3 | 3 |
| 26 | GS-1-16 | | 0 | 0 | 0 | 0 | 100 | 0 | - |
| 31 | JB-1-12 | | 0 | 3 | 3 | 0 | 93 | 0 | 0 |
| 39 | JJ-4-13 | | 0 | 0 | 3 | 0 | 97 | 0 | 0 |
| 45 | JM-1-16 | | 0 | 0 | 4 | 0 | 96 | 0 | - |
| 54 | MF-1-09 | | 0 | 0 | 0 | 0 | 96 | 4 | - |
| 63 | MO-1-14 | | 0 | 0 | 6 | 3 | 90 | 0 | - |
| 70 | NR-1-14 | | 0 | 0 | 16 | 0 | 81 | 3 | - |
| 81 | PE-6-02 | | 0 | 0 | 23 | 0 | 74 | 3 | - |
| 90 | PF-1-16 | | 7 | 0 | 0 | 0 | 93 | 0 | - |
| 97 | SW-1-16 | | 0 | 0 | 0 | 0 | 100 | 0 | - |
| 107 | WF-2-16 | | 0 | 0 | 9 | 0 | 91 | 0 | - |
| **Disgust Photos** | | | | | | | | | |
| 5 | A-1-25 | | 1 | 0 | 0 | 6 | 0 | 93 | - |
| 12 | C-1-04 | | 1 | 1 | 0 | 2 | 0 | 96 | - |
| 20 | EM-4-17 | | 0 | 0 | 0 | 3 | 0 | 97 | 0 |
| 27 | GS-2-25 | | 0 | 3 | 0 | 13 | 0 | 84 | - |
| 32 | JB-1-16 | | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| 40 | JJ-3-20 | | 0 | 12 | 0 | 0 | 0 | 88 | - |
| 46 | JM-2-08 | | 0 | 0 | 0 | 3 | 0 | 97 | - |
| 55 | MF-2-13 | | 0 | 0 | 0 | 10 | 0 | 90 | - |
| 64 | MO-2-18 | | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| 71 | NR-3-29 | | 0 | 0 | 0 | 17 | 0 | 83 | - |
| 82 | PE-4-05 | | 0 | 0 | 0 | 10 | 0 | 90 | 0 |
| 91 | PF-1-24 | | 4 | 0 | 0 | 0 | 0 | 96 | - |
| 98 | SW-1-30 | | 0 | 0 | 0 | 6 | 0 | 94 | - |
| 108 | WF-3-11 | | 0 | 0 | 0 | 3 | 0 | 97 | 0 |
| 109 | WF-4-22 | | 0 | 0 | 0 | 20 | 0 | 80 | - |
| **Neutral Photos** | | | | | | | | | |
| 6 | A-1-02 | F | 14 | 30 | 11 | 30 | 2 | 13 | - |
| 13 | C-2-03 | F | 6 | 35 | 0 | 26 | 0 | 32 | - |
| 21 | EM-2-04 | M | 25 | 3 | 3 | 0 | 0 | 0 | 69 |
| 28 | GS-1-04 | M | 13 | 21 | 0 | 21 | 4 | 42 | - |
| 33 | JB-1-03 | m | 0 | 13 | 3 | 3 | 0 | 3 | 78 |
| 41 | JJ-3-04 | M | 17 | 47 | 0 | 17 | 0 | 20 | - |
| 47 | JM-1-09 | F | 63 | 21 | 8 | 0 | 0 | 8 | - |
| 56 | MF-1-02 | F | 16 | 68 | 3 | 0 | 3 | 10 | - |
| 65 | MO-1-05 | F | 26 | 61 | 0 | 3 | 0 | 10 | - |
| 72 | NR-1-03 | F | 17 | 29 | 0 | 13 | 4 | 38 | - |
| 83 | PE-2-04 | M | 16 | 16 | 3 | 0 | 3 | 0 | 63 |
| 92 | PF-1-02 | F | 47 | 30 | 7 | 3 | 7 | 7 | - |
| 99 | SW-3-03 | F | 25 | 46 | 0 | 0 | 0 | 29 | - |
| 110 | WF-2-05 | M | 0 | 7 | 0 | 28 | 0 | 7 | 59 |

* Where a dash appears in the Neutral column, the judges did not have "Neutral" as an alternative choice in the study (see text).

Figure 12: Data from *Pictures of Facial Affect* (Ekman, 1976)

# Pictures of Facial Affect

For more than fifty years psychologists have explored relationships between facial expression and emotions. What emotions can be judged from viewing a face? How reliable are such judgments? How much does context influence judgments of emotion in faces? At what ages can children judge facial expressions of feelings? Do people of different cultures interpret facial expressions differently?

A review of this research can be found in Ekman, Friesen and Ellsworth (1972). Recently studies have addressed questions of personality differences in the ability to judge emotions and the relationship of brain hemisphere laterality to judgments of emotion from faces. Another interest in facial expressions has been to teach the accurate interpretation of the emotions expressed on the face. Allport in 1924 did one of the earliest of such studies. Presently, professionals in a number of fields are seeking to teach skills in interpreting emotions from facial expressions. Recently Ekman and Friesen (1975) published an extensively illustrated text designed to help those wishing to improve their skills in judging emotional reactions from facial expressions.

A major obstacle to all such research and training has been the lack of a comprehensive set of photographs of different people expressing the different emotions, yielding high inter-rater reliability, and widely available in pictures of consistently high technical quality. Frois-Wittman (1930) pioneered a set of photographs still in use. Unfortunately, the pictures are all posed by one person and they lack the quality which modern photographic technology can provide. The more recent Lightfoot Series (Schlosberg, 1954) suffers from the same defects. Both series have many photos that fail to produce satisfactory consensus among subjects in many studies.

The present set of 110 pictures represents a serious attempt to overcome the limitations of earlier efforts. With the aid of the best current technology in lighting and photography, more than a dozen persons were photographed repeatedly while attempting to express one of six emotions. Hundreds of photographs were studied over a period of several years to obtain a series which yielded consistent agreement among viewers about the emotion being expressed. The result is the *Pictures of Facial Affect.*

### Development of the Pictures

Six frequently-experienced emotions believed to yield characteristic facial expressions were chosen for study. These were: happiness, sadness, fear, anger, disgust, and surprise. Posers were trained to contract or relax different facial muscles associated with various facial expressions. Generally, posers were instructed to activate certain muscles rather than to pose a particular emotion.

From hundreds of photographs, the present set was finally chosen on the basis of empirical studies which measured the consistency of judgments of the various pictures. Photographs which yielded highly consistent judgments and which fit the authors' theory of facial expressions of affect were finally selected for inclusion in the set, which now provides 14 posers for the six emotions (plus one photograph of each poser in a "neutral" expression).

### Reliability Studies

The pictures of each person which the authors thought best represented the expressions of the six emotions were shown to groups of observers. They judged which of six emotion words best described each photograph. There were two variations in the judgment procedure and the norms were calculated differently for the two procedures to provide comparable normative data across all photographs in this set.

*Procedure 1.* Each slide was shown for 10 seconds to small groups of U.S. born college students. The number of male and female observers was approximately equal. The answer sheet provided a choice of six emotions: happy, sad, fear, anger, surprise and disgust. The observers selected the *one* word which best described the emotion expressed in each slide. The percentage of observers judging each of the six emotions was calculated for each slide.

Figure 13: *Pictures of Facial Affect* Brochure (Ekman, 1976)

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# APPENDIX F

## IRB APPROVAL FORMS

**Northern Michigan University**

Continuing Education
1401 Presque Isle Avenue
Marquette, MI 49855-5301

September 8, 2008

TO:     Justin P. Madigan

         Psychology

FROM:   Cynthia A. Prosen, Ph.D.
         Dean of Graduate Studies & Research

RE:     Human Subjects Proposal #  HS08-202

         "Effects of mood on perceived emotional intensity in photographic stimuli"

The Human Subjects Research Review Committee has reviewed your proposal and has given it final approval. To maintain permission from the Federal government to use human subjects in research, certain reporting processes are required. As the principal investigator, you are required to:

A. Include the statement "Approved by HSRRC: Project # (listed above) on all research materials you distribute, as well as on any correspondence concerning this project.

B. Provide the Human Subjects Research Committee letters from the agency(ies) where the research will take place within 14 days of the receipt of this letter. Letters from agencies should be submitted if the research is being done in (a) a hospital, in which case you will need a letter from the hospital administrator; (b) a school district, in which case you will need a letter from the superintendent, as well as the principal of the school where the research will be done; or (c) a facility that has its own Institutional Review Board, in which case you will need a letter from the chair of that board.

C. Report to the Human Subjects Research Review Committee any deviations from the methods and procedures outlined in your original protocol. If you find that modifications of methods or procedures are necessary, please report these to the Human Subjects Research Review Committee before proceeding with data collection.

D. Submit progress reports on your project every 12 months. You should report how many subjects have participated in the project and verify that you are following the methods and procedures outlined in your approved protocol.

E. Report to the Human Subjects Research Review Committee that your project has been completed. You are required to provide a short progress report to the Human Subjects Research Review Committee in which you provide information about your subjects, procedures to ensure confidentiality/anonymity of subjects, and the final disposition of records obtained as part of the research (see Section II.C.7.c).

F. Submit renewal of your project to the Human Subjects Research Review Committee if the project extends beyond three years from the date of approval.

It is your responsibility to seek renewal if you wish to continue with a three-year permit. At that time, you will complete (D) or (E), depending on the status of your project.

kjm

September 24, 2008

TO:     Justin P. Madigan
        Psychology

FROM:   Cynthia A. Prosen, Ph.D.
        Dean of Graduate Studies & Research

RE:     Modifications to Human Subjects Proposal  # HS08-202
        "Effects of mood on perceived emotional intensity in photographic stimuli"

The Human Subjects Research Review Committee has reviewed your modifications to the proposal and has given it final approval. To maintain permission from the Federal government to use human subjects in research, certain reporting processes are required. As the principal investigator, you are required to:

A. Include the statement "Approved by HSRRC: Project # (listed above) on all research materials you distribute, as well as on any correspondence concerning this project.

B. Provide the Human Subjects Research Committee letters from the agency(ies) where the research will take place within 14 days of the receipt of this letter. Letters from agencies should be submitted if the research is being done in (a) a hospital, in which case you will need a letter from the hospital administrator; (b) a school district, in which case you will need a letter from the superintendent, as well as the principal of the school where the research will be done; or (c) a facility that has its own Institutional Review Board, in which case you will need a letter from the chair of that board.

C. Report to the Human Subjects Research Review Committee any deviations from the methods and procedures outlined in your original protocol. If you find that modifications of methods or procedures are necessary, please report these to the Human Subjects Research Review Committee before proceeding with data collection.

D. Submit progress reports on your project every 12 months. You should report how many subjects have participated in the project and verify that you are following the methods and procedures outlined in your approved protocol.

E. Report to the Human Subjects Research Review Committee that your project has been completed. You are required to provide a short progress report to the Human Subjects Research Review Committee in which you provide information about your subjects, procedures to ensure confidentiality/anonymity of subjects, and the final disposition of records obtained as part of the research (see Section II.C.7.c).

F. Submit renewal of your project to the Human Subjects Research Review Committee if the project extends beyond three years from the date of approval.

It is your responsibility to seek renewal if you wish to continue with a three-year permit. At that time, you will complete (D) or (E), depending on the status of your project.

kjm

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