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Increased freezing and decreased positive affect in post-institutionalized children

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Abstract

Background—Early neglect is associated with increased risk of internalizing disorders in humans and with increased fear behavior in animals. When children are adopted out of orphanages in which they experienced institutional neglect, anxiety and depressive disorders often are not seen until adolescence. What has not been examined is whether even young children adopted from institutional care exhibit heightened fear or behavioral inhibition.

Method—Children adopted between 15 and 35 months from institutional care were examined twice during their first year post-adoption and compared to children of the same age reared in their birth families. A modified version of the Laboratory Temperament Assessment Battery for Preschoolers was used with the children being exposed to two mechanical toys designed to be highly arousing and fear-eliciting. Because children in institutions tend to exhibit low levels of positive affect, the children were also examined during exposure to two positive stimuli. Sessions were videotaped and coded by observers blind to the study purpose.

Results—Post-institutionalized children froze more in fear vignettes and were less positive in both fear and positive vignettes than non-adopted children. Group differences did not diminish significantly from the first session to the next, 6 months later.

Conclusions—Children exposed to early institutional neglect exhibit emotional biases that are consistent with their previously demonstrated risk for the development of internalizing disorders.

Keywords

Deprivation; neglect; fear; positive affect; international adoption; institutional care

Early childhood neglect increases the risk of affective pathology (Cicchetti & Toth, 1995). Animal models of early life stress have been used to help explicate the mechanisms involved in this association (Heim, Plotsky, & Nemeroff, 2004). Animal studies provide evidence that deprivation or disruption in parental care during sensitive periods early in life shapes the neurobiological systems that support fear and stress reactions towards larger and less well-regulated responses (Sanchez, Ladd, & Plotsky, 2001). Thus, when confronted with novel or arousing stimuli, animals that have been repeatedly separated from the mother, reared on inanimate surrogates, or otherwise exposed to low levels of nurturing care tend to freeze more and exhibit greater neophobia (Corcoran et al., 2012; Hall, 1998).

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To our knowledge, there are no studies examining deprived or neglected children's behavioral and emotional responses to novel, arousing, fear-eliciting stimuli. This is unlike research on typically developing children where we have numerous studies examining fear or behavioral inhibition in response to novel, arousing objects and people (see review, (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). In children exposed to early deprivation and neglect, examinations of negative emotionality have typically relied on questionnaires or interviews designed to assess internalizing behavior problems. Here the results have been mixed. While children entering child protection because of neglect tend to have a wide range of problems, including internalizing problems (Oswald, Heil, & Goldbeck, 2010), it is unclear whether these problems reflect current or early life experiences because these children often continue to experience high levels of psychosocial adversity. When children who experience deprivation/neglect early in life are removed from such circumstances and placed in permanent, supportive homes, meta-analyses indicate that internalizing problems are not elevated during childhood, although parents do seek mental health referrals for the children more readily than do parents of birth children (Juffer & Van Ijzendoorn, 2005).

We argue that children reared in institutions provide the human analogue of the animal studies used to model early life stress, as they have experienced generally low levels of contact with caregivers and, thus, a relative deprivation of social stimulation (van IJzendoorn et al., 2011). Furthermore, when these children are removed from institutional care and placed in families (i.e., post-institutionalized children, PI), this allows an examination of the impact of early deprivation not confounded with adversity at the time of the assessment. Although some studies of post-institutionalized children report elevated symptoms of anxiety and depression (Bos et al., 2011; Wiik et al., 2011), as noted, meta-analyses of this extensive literature contend that PI children do not necessarily exhibit clinically significant anxiety or depressive symptoms (Juffer & Van Ijzendoorn, 2005). Rutter, Kreppner & O'Connor (2001) drew similar conclusions when their sample of children adopted from Romanian institutions were young; however, as these children entered and progressed through adolescence, those adopted from institutional care after 6 months of age became more likely to develop affective psychopathology than did youth who were less than 6 months of age at adoption or who had never been in institutional care (Colvert et al., 2008). It is unclear whether a bias towards more fearful responding might have been present earlier, but was not detected because of a focus on problem behaviors as opposed to emotional dispositions.

In studies of typically developing children, behavioral inhibition or fearful responses to novel, arousing stimuli, especially if extreme, are associated with the later development of internalizing disorders (Chronis-Tuscano et al., 2009; Rosenbaum et al., 1993). Thus, a dispositional bias towards more fearful, inhibited responding might be shaped by early institutional neglect. With development, this bias in the context of other risk factors (see Fox et al., 2005) might increase the risk of clinically significant internalizing disorders by adolescence, even when children are removed from deprivation during early childhood.

This possibility seems likely given three recent neuroimaging studies. Among PI children who averaged eight years of age, longer exposure to institutional care prior to adoption was associated with larger amygdala volume, which in turn, was associated with higher scores on parent-reported internalizing problems (Tottenham et al., 2010). In another report on a related sample of children, larger fMRI responses to fear faces were noted for PI compared to never institutionalized children (Tottenham et al., 2011). Larger fMRI responses to fear faces has also been reported for 9- to 18-year-old youth who were either reared in institutions or neglected in their families of origin early in life (Maheu et al., 2010). Thus, these studies suggest that early deprivation may shape neurobiological systems that support heightened fear and inhibition.

To examine whether early institutional care resulted in a dispositional bias towards more fearful reactions, in the present study, we examined PI children responding to fear-evocative stimuli. The children were between 15 and 36 months of age at adoption, and we assessed them roughly 1.5 and 8 months post-adoption; thus, we were able to observe whether there was a bias when the children had only a small amount of experience in their adoptive homes. Based on the animal and neuroimaging studies described above, we predicted that PI children would be more fearful and inhibited in response to novel, arousing stimuli than would children of the same age who had been reared from birth in their families of origin. We chose to examine reactions to non-social stimuli because PI children are often overly friendly with strangers and this response may not reflect low fear as much as disordered social responding (Zeanah, Smyke, & Dumitrescu, 2002).

We also examined responses to stimuli designed to elicit positive affect. Low positive affectivity may be a precursor to depression (Caspi, Moffitt, Newman, & Silva, 1996; Klein & Shih, 1998). Positive affect has been examined in two separate studies of institutionalized and PI children. The St Petersburg-USA Orphanage Research Team (Team, 2008) reported that children reared in typical orphanages showed lower positive affect during a 3-minute free play period with their caregiver than did children reared in orphanages where caregivers had been trained to be more sensitive and responsive. In the Bucharest Early Intervention Project, children were presented at baseline, 30, and 42 months with positive stimuli from the infant version of the Laboratory Temperament Assessment Battery (Ghera et al., 2009). Children who had experienced institutional care early in life but were then randomly assigned to foster families showed low positive affect at baseline, but then gradually increased in positive affect until they expressed higher levels than did either the institutionalized or never institutionalized groups. In contrast, the never institutionalized group showed decreasing amounts of positive affect over time, perhaps because the stimuli used were chosen to elicit positive affect from infants, not preschoolers. Based on these two studies, we predicted that soon after adoption, PI children might display lower levels of positive affect, but with time in the family, positive affectivity would increase to levels seen among non-adopted children.

Method

Participants

PI children (34 girls, 26 boys) were adopted internationally from institutional care when they were between 15 and 35 months of age ($M=23.54$, $SD=4.74$, range 15-35). Institutional care as a percentage of pre-adoption care varied from 14% to 100% ($Mdn=90\%$). We compared PI to non-adopted (NA) children (25 girls, 25 boys) of similar ages who were being reared with their birth families; their education and income levels were similar to that of families who adopt internationally (PI $Mdn=$ \$100,000 to \$125,000; NA $Mdn=$ \$75,000 to \$100,000). Households comprised two parents in all of the NA families and in 54 of 60 PI families. Median education of all parents was a bachelor's degree. Sixteen of the PI children were from Russia/Eastern Europe/India, 20 from SE Asia including China, 5 from Latin America/Caribbean, and 19 from Africa.

Research was reviewed and approved by the University of Minnesota Institutional Review Board. Informed consent and HIPAA release forms were appropriately obtained.

Procedure

Recruitment—PI children were recruited from an International Adoption Clinic and local adoption agencies. Adoption agencies recommend visiting this clinic, and families most often make arrangements before the child's arrival. Families who released their names for

research contact were contacted, and arrangements were made to test their children. NA children were recruited from a registry of families who, soon after the child's birth, expressed interest in participating in research conducted in the university's child development program. We believe we found nearly all PI children in our age range who were adopted in our region; of those, 70% agreed to participate. Of the NA children whose families had elected to join the participant registry, 100% of those contacted agreed to participate.

Exclusion criteria were congenital or neurological disorders (including seizure disorders, endocrine disorders, heart defects); information regarding these diagnoses was collected from parents during phone recruitment, in questionnaires at the time of assessment, and through contact with the pediatric clinic in the United States where the child was first seen. Additionally, in order to focus on the effect of early life deprivation, participants were excluded based on evidence of prenatal alcohol exposure, as assessed through coding of facial features from digital photographs of frontal, ¾, and lateral views. Trained coders used the Astley FAS Facial Photographic Analysis Software to provide each child with a Facial 4-Digit Code Rank. Coders' agreement averaged .84 based on 14% of randomly selected photos. Children with scores of 3 or 4 were excluded; parents were informed of results and offered a visit with a clinician if they had elected to be notified during the consent process. Six PI children were excluded for FAS features, 1 NA child was excluded due to a parent-reported Autism diagnosis, and another NA child due to parent-reported prior abuse by the mother's ex-husband. The NA exclusions were to ensure a non-abused, typically-developing comparison group. The sample sizes reported above included only those participants left *after* application of exclusion criteria.

Protocol—Two sessions were conducted, one soon after adoption ($M=1.7$ mos, $SD=0.76$; Age: $M=26.7$ mos, range: 18.3-36.9 mos) and the other approximately 8 months after adoption ($M=8.26$, $SD=0.59$; Age: $M=33.5$ mos; $SD=5.4$, range: 24.7-44.3). The protocols were nearly identical. When the children first arrived at the laboratory, they were observed in a modified strange situation that included a graded approach and interaction with an unfamiliar adult, as well as brief separations. At approximately 30 minutes into the session, the Laboratory Temperament Assessment Vignettes were conducted. Parents completed behavioral and emotional problem questionnaires at both sessions. An evaluation session was offered to the PI group twelve months post-adoption in collaboration with the International Adoption Clinic.

Four 2-minute vignettes, two fear and two positive, were adapted from Goldsmith's Laboratory Temperament Assessment Battery for Preschool-age Children (Lab-TAB, (Goldsmith, Reilly, Lemery, Longley, & Prescott, 1999). Fear vignette stimuli were remote controlled toys: flip cars that moved about erratically and periodically flipped over and mechanical "creature" cars that were costumed with feathers and eyes. Different cars were used at each session. The experimenter controlling the cars was behind a screen. The cars entered the room, advanced towards the child, backed up, then advanced again, getting close but never making contact. The positive stimuli were soap bubbles that the experimenter blew and invited the child to pop and balloons that were sturdy, attached to a large rubber band, and could be bounced about. The same bubbles and balloons were presented at each session. The order of presentation alternated between negative and positive (always ending on positive), and the type of stimuli within fear and positive vignettes switched order for the second session. The parent was in the room during these vignettes. S/he was told to position the child to her/his side, facing outward at the beginning of each 2-minute vignette. Parents were allowed to smile and comfort, but not to talk or encourage the child to approach to objects.

Lab-TAB Measures

Coding—Sessions were videotaped and coded by individuals blind to the study's purpose using a scheme adapted from Goldsmith and colleagues (Goldsmith et al., 1999) and from a qualitative, global coding scheme developed by Durbin and colleagues (Durbin, Klein, Hayden, Buckley, & Moerk, 2005). Epoch variables were coded every 20 seconds. They included (1) affect intensity (0=none to 4=extremely high) scored separately for positive and fear affect, (2) intensity of freezing behavior (0=none to 3=tensing of entire body, based on definitions of freezing used in Kalin et al., 2004), (3) proximity to the stimulus (0=beyond arms reach to 3=holding or manipulating), (4) proximity to parent (0=beyond arms reach to 4=clinging), (5) proximity to experimenter which was applicable only in positive vignettes (0=beyond arms reach to 4=touching), and (6) intensity of escape (0=no escape behavior to 3=vigorous escape behavior) scored only in the fear vignettes. In scoring affective intensity, coders took account of intensity in face, voice, and gesture channels with examples of low, medium and high intensity provided for each and the score for each epoch based on a combination of intensities across these levels of expression. When intensity fluctuated within a 20-second epoch, the highest intensity was scored. After completing epoch coding, observers reviewed the vignette and provided four summary emotion scores: overall intensity of each affect (0=no expression to 4=extremely high intensity) and overall duration (1=0-20% to 5=81-100%) of low, moderate and high intensity affect for each vignette. In addition they completed three other scores: 1) positive engagement (0=no engagement to 4=high engagement, child participates with enthusiasm), 2) passivity versus initiative (0=consistently passive to 3=child initiates ideas and/or actively attempts to change the situation), and 3) duration of freezing or the sum of all seconds during which any freezing occurred.

Approximately 15% percent of the total episodes were double-coded for interrater reliability. As the scales were ordinal, weighted percent agreements were computed (Cohen, 1968; Feinstein, 2001) and averaged across vignettes and sessions. For the epoch variables, the weighted percent agreements ranged from 87% to 97%. For the global variables, the weighted percent agreements ranged from 73% to 97%.

Summary Variables—First, scores were averaged across vignettes of the same type, fear versus positive. Then, to allow examination of change from session 1 to 2, we standardized the variables within type (fear/positive) using grand mean centering. Four summary scores were computed for each type of vignette and each session: Positive Affect, Fearful Affect, Engagement and Freezing. The distribution of each variable was examined. There were too few instances of fear or freezing in positive vignettes to analyze. The other scores were computed as follows: (1) Positive Affect was the standardized and averaged scores for the intensity of positive affect (epoch score), the mean positive intensity (global score), and the positive affect duration (global score weighted for low, medium and high durations and then summed). (2) Fear Affect was the standardized and averaged scores for the intensity of fear affect (epoch score), the mean fear intensity (global score) and the duration of fear affect (global score weighted for low, medium and high durations and then summed). (3) Engagement was the standardized and averaged scores of proximity to stimulus (epoch score), the mean for proximity to experimenter (epoch score positive vignettes only), the mean for passivity versus initiative (global score) and the mean for positive engagement (positive vignettes only). (4) Freezing was the standardized and averaged sum of intensity of freezing and proportion of time spent freezing. Cronbach alphas were above .75 for all summary variables.

Questionnaires

Adoption Information: Parents provided information on the child's country of origin, duration of time in institutional care, and age when the child came into the parent's full-time care.

Brief Infant Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2002): This 42-item questionnaire, with good internal consistency and cross-age stability, was completed by the parent at the first two assessments. The problem scale was used to index behavioral and emotional problems. The Child Behavior Checklist for 1.5-5 Years (CBCL/1.5-5) was completed at the 12-month assessment, but only by PI families. T-scores were computed and the percent of children above the clinical cutoff ($T = 65$) for Internalizing Problems was examined.

Results

Emotional Problems

For the BITSEA problem scale, covarying age, there was a significant interaction between session and group, $F(1,94)=7.40$, $p<.01$, $\eta^2=.07$. The PIs were reported to have more behavior problems than the NAs initially ($PI_M=9.52$, $SD=.65$, $NA_M=6.2$, $SD=.66$), but not at 8 months post-adoption ($PI_M=7.5$, $SD=.59$, $NA_M=6.4$, $SD=.61$). For the PIs, median CBCL T-score for Internalizing was 47 at 12-months post adoption; only 2% scored above the clinical cutoff.

Correlations

The measures were significantly correlated with type of vignette, but not sufficiently to preclude separate analyses.

Response to Fear Vignettes

A general linear models multivariate repeated measures analysis was computed with a within subject factor of session and between subject factors of group and sex. Age at the first assessment was used as a covariate. Four variables were examined: fearful affect, positive affect, engagement, and freezing (see Table 2). There was a significant multivariate effect of age, Hotelling's $F(4, 103)=4.94$, $p<.01$, $\eta^2=.15$ and group, Hotelling's $F(4, 103)=3.37$, $p<.05$, $\eta^2=.12$. There were no multivariate main effects of sex or session, nor were there any significant interaction effects. Univariate tests revealed that age was positively associated with positive affect ($p<.001$) and engagement ($p<.05$). Univariate follow-up tests and descriptive statistics for group are shown in Table 2. PI children did not differ from NA children in either fearful affect or engagement, but did exhibit more freezing (see Figure 1) and less positive affect (see Figure 2).

Response to Positive Vignettes

A similar analysis was conducted for the Positive Vignette data examining positive affect and engagement. There were significant multivariate effects of age, $F(2, 105)=6.73$, $p<.01$, $\eta^2=.12$, session, $F(2, 105)=7.39$, $p<.01$, $\eta^2=.12$ group, $F(2, 105)=7.22$, $p=.01$, $\eta^2=.12$, and sex, $F(2, 105)=4.75$, $p<.05$, $\eta^2=.08$. There were no significant interaction effects. Univariate effects revealed that age was positively associated with greater positive affect ($p<.001$) and more engagement ($p<.05$). Univariate follow up tests revealed that a sex difference for engagement in the positive vignettes, $F(1, 106)=7.56$, $p=.01$, $\eta^2=.07$, with girls engaging less ($M=-.14$, $SD=.68$) than boys ($M=.16$, $SD=.48$) across both sessions. Univariate follow-up tests for session and group are shown in Table 2. Overall, positive affect and engagement increased across sessions; however, PI children exhibited less positive affect than did NA

children (see Figure 2; note that this figure presents the age-regressed values and thus will not match the raw values shown in table 2).

Association with Adoption Measures

Partial correlations, controlling for age, were computed to examine whether variables that differed between PI and NA children were related to how long the child was in institutional care and/or how old they were when they came into their adoptive parent's full-time care. To reduce the number of correlations computed, the four positive affect variables were averaged, as were the two freezing variables. There were no significant correlations with duration of institutional care, but lengthier periods before the child came into the full-time care of their adoptive parents predicted lower scores on positive affect, partial $r(57) = -.42$, $p < .01$.

Discussion

Based on the animal literature and neuroimaging evidence with PI children, we predicted that stimuli used to assess temperamental fearfulness among young children would elicit more inhibited, fearful responses from PI children than from children born and raised in their families of origin. The results partially confirmed our predictions.

As expected, parent reports of emotional problems were not particularly elevated. Although parents reported more problems in the first two months, by eight months post-adoption, problems scores were not elevated over those for non-adopted children. At 12 months post adoption, internalizing scores were generally low and only two percent met or exceeded the clinical cutoff. The data on fear responses showed, as expected, that the fear stimuli (flip and creature cars), which were highly arousing, elicited a range of responses from typically-developing, non-adopted children. Some children were only frightened and avoided the toys, while some exhibited a mix of fear and positive affect. Age was related to reactions to these stimuli, with older children exhibiting more approach and positive affect. PI children responded differently from NA children, but their differences did not involve the expression of more fearful affect or less engagement. Instead, they froze more and showed less positive affect. Freezing is often used as an index of fear in animal studies. In both rats and non-human primates, the amygdala plays a role in freezing to both conditioned and unconditioned stimuli (Kalin, Shelton, & Davidson, 2004; Power & McGaugh, 2002). However, it is difficult to reconcile the heightened incidence of freezing with the absence of group differences in the expression of fearful affect in face, voice, and gesture and in approach and engagement behaviors with the fear stimuli. It might be that different neural systems regulate freezing and facial and vocal reactions to these fear stimuli, and thus experience might have differential impacts on these systems. Indeed, among adults, amygdala lesions have marked effects on the processing of fear expressions in others, while not impacting the individual's expression of fear in face, voice, and gesture (Anderson & Phelps, 2000). In addition, in nonhuman primates, it has been shown that the amygdala plays a role in acute fear reactions, including freezing, but lesions of the amygdala do not affect other indices of anxious temperament (Kalin, Shelton, Davidson, & Kelley, 2001). Finally, it might be that freezing in the present study was less an expression of fear than a reflection of uncertainty about how to respond. When frightened, children reared in family settings quickly turn to the parent for comfort and safety. However, children who have not had stable, supportive relations may be more uncertain and may take longer to organize security-seeking responses. If freezing in the present study reflected less certainty about how to cope, as these children get older, we might expect freezing to decrease as they learn more active means of responding to arousing, potentially threatening stimuli. However, freezing did not decrease significantly across sessions in the present study.

Turning to the positive vignettes, based on two previous studies, one involving PI children (Ghera et al., 2009) and one involving children still living in institutional care (Team, 2008), we predicted that positive responses to pleasurable stimuli would be low when children first arrived, but would increase once children were placed in a supportive family context, with any differences with NA children decreasing over time. This was not what we found. As in reactions to the arousing and potentially fear-eliciting stimuli, PI children showed less positive affect than NA children to bubbles and balloons, but there was no interaction of group by session. These two sessions, however, were only 6 months apart. An examination of Figure 2, Panel B, which depicts age-corrected values, suggests that if these children were followed for longer periods of time, our results might resemble those obtained by Bucharest Early Intervention Project (Ghera et al., 2009). That is, the NA children might become less interested in these stimuli, while the PI children find them increasingly interesting and enjoyable. If this were found, it might suggest that the positive affect results merely reflect a delay in maturation. However, we cannot conclude that based on the present data. Furthermore, taking reactions to the positive and fear vignettes together, there is clear indication that positive affect is reduced for PI children. This was particularly true for children who were older when they arrived in their families. This finding might be consistent with evidence that older PI children are less sensitive to reward anticipation than are children without an early history of deprivation (Mehta et al., 2010). We will need to follow these children to determine whether positive affect remains reduced and whether it is predictive of more anhedonia and/or increased internalizing problems over time.

There are a number of limitations to this study that need to be acknowledged. The children were not, of course, randomly assigned to institutional care and adoption; thus, it is possible that the differences between groups were related to factors other than early life experiences. We did assess the majority of the children who were adopted from institutions into our catchment area; however, these children only reflect a small percentage of the children reared in institutions worldwide. The sample was heterogeneous, which may have added noise to the assessment, but this also may increase the generalizability of the results. The fear and positive affect assessment occurred after the children had been through several assessments that included a modified strange situation followed by a thirty minute period of mother-child interaction that involved both a free and structured play task and clean-up. The children might have behaved differently had we tested them immediately upon arrival when the testing situation was more novel. Finally, these data only reflect PI affective reactions in the first year following removal from institutional care. It remains to be seen how these children will respond as they continue in their adoptive homes.

Overall, these results suggest that during that first year following adoption, PI children respond with less positive emotion and more freezing to both pleasant and highly arousing stimuli. A reduction in positive emotionality and heightened freezing, if they persist, may predict a heightened risk of anxiety and depressive symptoms for children with early histories of deprivation and neglect. These findings should encourage attention to emotional disposition, and not solely to emotional behavior problems, in children who experience early adverse care.

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Abbreviation

PI post-institutionalized

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Key points

- Children reared in adverse early environments are at heightened risk for the development of affective disorders during adolescence.
- Animals exposed to early deprivation exhibit heightened fear responses to novel, arousing stimuli
- Children adopted from institutions/orphanages between 1.5 and 3 years of age showed heightened freezing and decreased positive affectivity in response to a standard set of stimuli.
- With repeated exposure, the post-institutionalized children became less inhibited and more positive, but the differences with children who had not been deprived did not diminish.
- A dispositional bias toward high fearfulness to novelty as well as low positive affectivity should be considered in addition to clinically relevant behaviors when examining early risk for the development of affective psychopathology in children with a history of neglect.

Figure 1. Freezing during fear vignettes. Standard scores created using grand mean centering and regressed on age at session 1. Bars reflect standard errors of the mean.

Figure 2. Positive affect during fear (Panel A) and positive (Panel B) vignettes. Standard scores computed within type of vignette using grand mean centering regressed on age at session 1. Bars reflect standard errors of the mean.

Table 1

Stability and Inter-Correlations of Measures

r's > .18 are p<.05; r's > .25 are p<.01, ns=nonsignificant

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Fear Vignettes												
1 Fear.s1	1.0	.47	-.47	-.24	-.46	-.33	.60	.36	ns	ns	ns	ns
2 Fear.s2		1.0	-.36	-.50	-.37	-.59	.43	.72	ns	ns	ns	-.22
3 Pos.s1			1.0	.47	.51	.39	-.45	-.40	.30	.21	.30	ns
4 Pos.s2				1.0	.27	.48	ns	-.49	.34	.38	.25	.24
5 Engage.s1					1.0	.53	-.44	-.38	.20	ns	.32	.19
6 Engage.s2						1.0	-.32	-.62	.20	ns	.34	.26
7 Freeze.s1							1.0	.38	ns	ns	-.24	ns
8 Freeze.s2								1.0	ns	ns	-.28	-.28
Positive Vignettes												
9 Pos.s1								1.0	.31	.56	.24	
10 Pos.s2									1.0	.21	.41	
11 Engage.s1										1.0	.31	
12 Engage.s2											1.0	

Table 2

Fear Vignettes Univariate Tests

Variable	PI or NA	Session		F	Group η^2
		Means and (SDs)			
		1	2		
Fear Affect	PI	.20 (.82)	-.02 v	1.12	NA
	NA	.01 (.91)	-.22 (.89)		
Positive Affect	PI	-.48 (.74)	.06 (.82)	7.34**	.07
	NA	-.04 (.85)	.54 (1.03)		
Engagement	PI	-.21 (.85)	.13 (.98)	.01	NA
	NA	-.17 (.97)	.27 (.89)		
Freezing	PI	.26 (.85)	.00 (.78)	4.29*	.04
	NA	-.11 (.64)	-.20 (.62)		

*
=p< .05;
**
=p<.01

Table 3

Positive Vignette Univariate Tests

Variable	PI or NA	Session Means and (SDs)		Session		Group	
		1	2	F	η^2	F	η^2
Positive Affect	PI	-.53 (.91)	.14 (.78)	5.95*	.05	7.97**	.05
	NA	.06 (.97)	.40 (.80)				
Engagement	PI	-.41 (.88)	.39 (.66)	13.54***	.11	.32	NA
	NA	-.24 (.88)	.27 (.59)				

*
=p<.05;

**
=p<.01;

=p<.001