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Abstract: The goal of the current study was to examine how the presence of a best friend might serve as protection against the effect of negative experiences on global self-worth and the hypothalamic-pituitary-adrenocortical axis (HPA axis). A total of 103 English-speaking male (*n* _ 55) and female (*n* _ 48) participants from Grade 5 (*M* = 10.27 years) and Grade 6 (*M* = 11.30 years) completed booklets about their experiences that occurred 20 min previously and how they felt about themselves at the moment, and they provided saliva multiple times per day over the course of 4 consecutive days. Having a best friend present during an experience significantly buffered the effect of the negativity of the experience on cortisol and global self-worth. When a best friend was not present, there was a significant increase in cortisol and a significant decrease in global self-worth as the negativity of the experience increased. When a best friend was present, there was less change in cortisol and global self-worth due to the negativity of the experience.

Keywords: friendship, negative experiences, hypothalamic-pituitary-adrenocortical axis, global self-worth

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Various studies have shown that friendships have the potential to serve as protection against later adjustment difficulties that result from negative experiences (Adams & Bukowski, 2007; Hodges, Boivin, Vitaro, & Bukowski, 1999; Prinstein, Boergers, & Vernberg, 2001), but little is known about how friendships might provide this protection in a more proximal manner to the actual negative event. The goal of the current study was to examine how the presence of a best friend might serve as protection against the effect of negative experiences that happen over the course of multiple school days on global self-worth (GSW) and the hypothalamic-pituitary-adrenocortical axis (HPA axis), outcomes that were measured relatively proximal to the event.

Friendships as Protection Against the Effects of Negative Experiences

The idea that friendships might have the ability to block the effects of negative experiences is not a new one. Harry Stack Sullivan (1953) theorized that friends, or as he called them "chumships," could negate the effects of negative experiences, such as poor parenting. In general, this theory suggests that best friends help adolescents interpret negative experiences especially in terms of how the experience might relate back to the adolescent and the adolescent's self-concept in the context of the negative experience. In addition, the theory suggests that late childhood/early adolescence, the developmental period examined in the current study, is a particularly important period in this respect because this is when individuals are often confronted with understanding new experiences without their parents. The general idea is that there are differential outcomes for the same negative experiences depending on the relationship context in which the negative experience occurs. In a negative relationship context, such as not having a best friend present, there would be a strong association between negative experiences and the outcome, whereas in a positive relationship context, such as having many friends or high quality friendship support, there would be a weak link or no link at all between the negative experiences and the outcome due to protective qualities of friendships. There are various studies that support this hypothesis for different negative experiences: peer victimization (Hodges et al., 1999; Prinstein et al., 2001), childhood sexual abuse (Adams & Bukowski, 2007), and negative parenting behaviors (Schwartz, Dodge, Pettit, Bates, & the Conduct Disorders Prevention Research Group, 2000).

Although there is evidence for the protective effects of friendships against the later outcomes of negative experiences, there is little understanding of how friendships might provide this protection more proximally to the negative event. The current study attempted to understand the protective effects of friendships in the face of negative events by examining GSW and the HPA axis. In this respect, the current study did not focus on the long-term outcomes of negative events, such as depressive symptoms and anxiety, but rather on intermediary factors that are affected by the event more proximally in terms of time and, in turn, that have also been shown to mediate the effects of negative experiences on later outcomes. In other words, the current article focuses on the protective effects of best friendships on factors—GSW and the HPA axis—that are affected moments after the negative event and have also been shown to affect later adjustment.

Several studies have delineated pathways for negative experiences concerning both GSW and the HPA axis. GSW not only is central to the theoretical framework of Sullivan (1953) as described above, but it also has been shown to be predicted by negative experiences, such as peer victimization (Egan & Perry, 1998; Prinstein et al., 2001). In addition, it has been shown that the link between peer victimization and

changes in depressive symptoms over time is through lower GSW (Adams & Bukowski, 2008; Troop-Gordon & Ladd, 2005). Other studies have found GSW to serve as a mediator of the effects of negative events on adjustment in a similar way for other types of negative events, such as negative parenting behaviors (Garber, Robinson, & Valentiner, 1997) and childhood abuse (Stein, Leslie, & Nyamathi, 2002).

Similar findings have been shown for the HPA axis mediating the link between negative experiences and depression. One purpose of the HPA axis is to work as a response system to stress by secreting cortisol in response to negative experiences, and it is this hormone that directly affects various bodily systems. Numerous studies have shown stressful experiences to be directly linked to increases in cortisol (Dickerson & Kemeny, 2004; Vaillancourt et al., 2008), as would be expected, but over time, the exposure to negative, stressful experiences has also been shown to alter the operation of this system to cause it to become hyper- or hyporeactive to stressful experiences depending on various factors such as the proximity to the event or experiences (Cicchetti & Rogosch, 2001; Miller, Chen, & Zhou, 2007; Trickett, Noll, Susman, Shenk, & Putnam, 2010). In turn, disrupted HPA systems have been shown to be associated with internalizing problems (Burke, Davis, Otte, & Mohr, 2005; Gue´chot, et al., 1987; Holsboer, 2000). The purpose of the current study was to test whether having a friend present during stressful experiences serves as protection against the decreases in GSW and increases in cortisol as a result of negative experiences.

Hypotheses

We hypothesized that the increases in cortisol and decreases in GSW due to the negativity of an experience would be stronger when a best friend was not present during the event than when a best friend was present during the event. Specifically, it was thought that as the negativity of the experience increased, levels of cortisol would increase and GSW would decrease after the event when a best friend was not present. On the other hand, it was thought that when a best friend was present during the event the effect of the negativity of the experience on cortisol and GSW would be weaker.

Method

Participants

A total of 103 English-speaking male (n = 55) and female (n = 48) participants from Grade 5 (M = 10.27 years) and Grade 6 (M = 11.30 years) were recruited from a public school in a community near the greater Montreal metropolitan area. The population of the school came from middle-class, English- and French-speaking neighborhoods and was predominantly European–Canadian. Although English was not the first language of all participants, all instruction at the school was in English and students were fluent in English. A total of 134 consent letters were sent to the parents, with an 85.07% (n = 114) return rate of the letters and a 76.87% (n = 103) participation rate.

Procedure

After receiving parental consent and child assent for participation, five times per day for four consecutive school days (Tuesday through Friday) participants completed two tasks. More specifically, they were assessed 30 min after waking (*M* = 6:45 a.m., *SD* = 25.80 min), after the start of school (*M* = 8:15 a.m., *SD* = 24.60 min), after the end of first recess (*M* = 10:00 a.m., *SD* = 29.40 min), after lunch period (*M* = 12:25 p.m., *SD* = 21.00 min), and then at the end of the school day (*M* = 2:00 p.m., *SD* = 16.20 min). For all time points the participants first completed a daily booklet where they reported about their experiences 20 min previously and also how they felt about themselves at the moment. While completing the booklets each time, participants expurgated 5 ml of saliva into a plastic vial to provide measures of cortisol. For the time points that took place at the school (i.e., all except the first assessment of the day), students completed the booklets in a classroom and study staff were present to help and provide instructions to the participants for completing the booklets and providing the saliva samples. In this respect, the study staff was able to provide a specific reference concerning the previous 20 min (e.g., "20 minutes ago was just before you came back to class from recess"). The vials were then sealed, placed into plastic bags that were coded for the day and time of day, temporarily stored in a container with dry ice, and then placed in long-term storage. For the first daily time point, participants were verbally instructed (as well as given written instructions) about completing the task 30 min after waking the following morning and were given a booklet, vial to provide saliva, and a plastic ziplock bag to transport the booklet and vial to school.

Measures

To provide study measures, students completed booklets and provided saliva five times per day over the course of four consecutive days. When completing the booklets each time, the participants were first instructed to report about experiences that had occurred 20 min previously. During each instance the time of day was recorded and later recoded as hours since waking (e.g., 2.5 hr = two and one half hr after waking).

Experience context. In reporting about their experiences 20 min previously, participants recorded who they were with indicating one or more of the following: alone, parents, sister(s)/ brother(s), best friend, friend, boy friend/girl friend, classmate(s), stranger(s), teacher(s), or other. From this information two measures were created. The first measured the presence of a best friend: best friend was present (coded as 1) or not present (coded as =1). In this respect, an indication of best friend presence could indicate being alone with the best friend or could also mean that the best friend was present along with others. The second measure of who was present measured if any type of friend was present: a best friend or friend was present (coded as 1) or neither a best friend nor friend was present (coded as =1). This measure would test if the buffering effects were specific to best friends or to friends in general. It should be mentioned that the number of experiences where other options (e.g., parents) were indicated was very small and, thus, could not be considered separately in the analyses. All told, there were 1,155 experiences measured, with 77.6% of the experiences occurring without the best friend present and 22.4% with the best friend present, and 38.2% occurred with best friend or friend present and 61.8% occurred with neither best friend nor friend present.

Experience negativity. For each experience, participants were asked, "How did you feel about it?" Participants' answers could range from 1 (*very positive*) to 7 (*very negative*; $M = 1.98$, $SD = 1.59$).

Global self-worth. Each time the participants completed the booklet, they also completed two questions about their GSW: "I like myself" and "I am happy with the way I am." The scales for these items ran from 1 (*really disagree*) to 5 (*really agree*; $M = 4.16$, $SD = 1.09$). There was high internal reliability between these items with a Cronbach alpha of .81.

Cortisol. Salivary cortisol was assayed with a kit from DSL (DSL, Webster, Texas) with procedures modified to increase the sensitivity of the cortisol assay. Briefly, 50 μL of saliva were incubated with 50 _L of 125I-cortisol and 50 _L of primary antibody and placed in a waterbath at 37 °C for 2 hr. A 500 _L PBS wash was added to the tubes prior to centrifugation. The pellet, representing the bound cortisol, was then counted in a gamma counter, and cortisol concentrations were calculated from a standard curve. The limit of detection for cortisol was 0.01 mg/dl, and the intra- and interassay variabilities were 4.0% and 4.6%, respectively (on a range of 0.1–10 μ g/dl dose). Analyses conducted to identify outliers in the distributions of the cortisol scores found only six instances (of over 2,000) of assessments in which scores were more than 2.5 standard deviations from the mean at a particular time or day. These outliers were drawn in so that all scores were within a reasonable perimeter around the mean. Raw cortisol values were log transformed for normality after adding 1 to each score ($M = .06$, $SD = .06$).

Results

To be able to account for the within-subject effects found between days and over the course of each day and the between-subjects effects used to test the effects of the presence of a best friend, we used a multilevel modeling analytic framework. Unconditional models revealed that 74.47% of the variability in cortisol was a function of sampling differences (Level 1, $n = 1{,}155$) and the rest was a function of between-subjects differences (Level 2, $n = 103$). For general self-worth, the unconditional model detailed that 18.65% of the variability was at Level 1, with the rest at Level 2. Using this framework, we tested two models on both cortisol and GSW. The first model examined the change over time pattern found for individuals on each outcome variable by entering the time of day, the time of day squared, and the day (range = 1 to 4, Day 1 scored as 1 and Day 4 scored as 4) into the Level 1 model. The second model, which had the first model nested within it, specifically tested the research questions at hand by adding the variables of the negativity of the experience, who was present, and the interaction between these two variables. Since the daily patterns in the outcome measures were accounted for in this model, a significant interaction indicated that the unique combination of the negativity of the experience and who was present during the experience predicted change in the outcome variable above and beyond the individual's daily pattern in cortisol or GSW. Since preliminary analyses found a three-level model (i.e., individual samples nested within days nested within individuals) and the two-level model described above had the same pattern of results, the two-level model is presented here for ease of presentation.

It should also be mentioned that none of these findings were qualified by gender or friendship status. Analyses were performed and found that gender, friendship characteristics (i.e., having a reciprocated friendship and the number of reciprocated friendships), and the interaction between gender and each of the friendship characteristics did not moderate any of the four interactions in the Level 1 analyses. In

addition, preliminary analyses also found that the buffering effects detailed below were limited to best friends and not to friends in general. Specifically, the same analyses described below were performed replacing the best friend present versus not present measure with a measure of whether a best friend or a friend was present versus not having a best friend or friend present. In these analyses, none of the interaction effects were found to be significant (for cortisol, unstandardized coefficient = .005, *t* value = 0.79, *p* _ *ns*; for GSW, unstandardized coefficient = .003, *t* value = 0.10, *p* = *ns*). This indicates that the protective effects reported below were specific to only best friendships.

Change Over Time Model: Patterns for Cortisol and GSW Over the Course of the Week and Day

As shown in Table 1, the change over time models examined the effects of day of the week, the linear effect over the course of the day, and the curvilinear effect over the course of the day for both cortisol and GSW.

Cortisol. As has been found in previous studies, there was a significant linear and curvilinear effect of cortisol over the course of the day. The highest rates of cortisol were seen just after waking, with a gradual curvilinear decrease in cortisol levels over the course of the day, ending with a slight increase at the end of the school day (explaining 13.43% of the within-day variability). In addition to this pattern over the course of the day, there was a significant effect for the day of the week, with higher levels of cortisol found earlier in the week than later in the week (explaining 39.18% of the remaining between-day variability).

GSW. Over the course of the day and week, GSW was found to be quite stable, with no significant effect found for day of the week, linear effect over the course of the day, or the curvilinear effect over the course of the day. The change over time model explained only .37% of the between-sample variability, leaving over 99% of the variability remaining to be accounted for.

Full Model: Does Having a Best Friend Present Predict the Effect of a Stressful Event on Changes in Cortisol and GSW?

To test if the presence of a best friend had an effect on the association between the negativity of the experience and each of the outcome variables (cortisol and GSW), the main effect of negative experience, the main effect of who was present, and the interaction between the two were added to the model of change over time. As shown in Table 1, the presence of a best friend predicted the effects of a negative experience on both changes in cortisol and GSW, as indicated by the significant interactions.

Cortisol. As seen in Table 1, there was significant interaction for cortisol. As shown in Figure 1, an example of the buffering pattern was found for cortisol when the best friend was present during the event (explaining 1.34% of the remaining Level 1 variability). Model fit statistics indicated that the addition of the effect of negative experience, the main effect of who was present, and the interaction between the two to the cortisol model significantly reduced Level 1 variability, $\chi^2_{(5)} = 692.18$, $p < .05$. For those instances when the best friend was present, there was little change in cortisol as the experiences increased in negativity. On the other hand, for those instances when the best friend was not present, the

increase in cortisol associated with the negativity of the event was stronger than the same association when the best friend was present.

GSW. As seen in Table 1, there was a significant negative experience by friend presence interaction for GSW (explaining 2.84% of the remaining Level 1 variability). Model fit statistics indicated that the addition of the effect of negative experience, the main effect of who was present, and the interaction between the two to the cortisol model significantly reduced Level 1 variability, $\chi^2_{(5)} = 70.32$, $p < .05$. As shown in Figure 2, another example of the buffering pattern was found for GSW when the best friend was present during the event. For those instances when the best friend was present, there was no change in GSW as the experiences when the best friend was not present, rates of positive GSW were lower compared with experiences rated more negatively.

Discussion

The goal of the current study was to examine the protective effects of friendships. To do this, the study focused on outcomes that were proximal to the negative event and have been shown to be associated with later outcomes, specifically the mechanisms of GSW and the HPA axis. The overall pattern for the results was that having a best friend present during an experience buffered the effect of the negativity of the experience on both mechanisms. When a best friend was not present, there was an increase in cortisol and a decrease in GSW as the negativity of the experience increased. When a best friend was present, there was less change in cortisol and GSW due to the negativity of the experience.

These findings provide a better understanding as to how close relationships might serve as buffers against the adjustment difficulties that result from negative experiences. Previous research on the topic has focused on adjustment problems such as depression that are distal to the event and, in turn, has resulted in small and inconsistent effects. By focusing on the effect of friends on outcomes, such as the HPA axis and GSW, that are both more proximal to the event and have been suggested to be precursors to adjustment difficulties, it Is easier to understand how and in what circumstances friendships might serve as buffers. For instance, previous research has often focused on the buffering effects of having or not having a friend, but the current findings suggest that some of the buffering effects of having a friend might not be as powerful if the friend is not present when bad things happen, as would be the case if the friend does not go to the same school or is in a different classroom.

In moving forward toward the goal of understanding the role of friendships as protection, it is important for future studies to examine more details of the negative experiences than could be examined in the current study. For instance, it will be important not only to account for the source of the negativity (e.g., it could be that the friend is the source of the negativity of the interaction) but also to know exactly what it is that friends might be doing to provide protection (e.g., physical protection, keeping the victim from internalizing the event, emotional support). This suggestion is important not only for experience sampling studies, such as the current study, but also for survey studies. In this respect, it is important not only to examine if someone does or does not have a reciprocated friendship or if a friend is present or not present but also to move to examining the specific processes of friendships that might actually provide the protection. For the current study it is unknown what it is about a friend being present that is protective. It might be that the mere presence might provide the feeling of or actual physical protection or the

protection may come as a result of some direct support, such as talking about the event or providing encouragement. Future studies will need to focus on friendship processes that occur as a result of negative experiences to know exactly what it is about friendships that provide protection against the outcomes of negative events.

When interpreting the results, one should keep a few issues in mind. For instance, one should consider alternative interpretations of the current findings. Specifically, it may be that adolescents with reactive HPA pathways and GSW may not have many best friends and, thus, would be less likely to have a best friend present. In addition, one should keep in mind that the effects for cortisol and GSW might not be separate. In other words, it is possible that HPA reactivity may cause GSW reactivity or vice versa. Although no studies have demonstrated this connection, these two mechanisms have been found to be associated with similar predictors and outcomes. Finally, it should be mentioned that the current study was limited to examining only friendships due to the time frame of when the data were collected during the weekday. It would have been fruitful to examine other close relationships other than friends, but most of the data were collected during the school day when friends and best friends were frequently present. Although other individuals were present during many experiences, there was not a critical mass of experiences with any one type of the other relationships present to analyze in a similar manner as friends and best friends. Future studies may want to examine experiences that occur over the weekend or in the evening when it is more likely that siblings and parents may be present to test the effects of these close relationships.

In sum, the current study found that the presence of a best friend during a negative event provided protection against activation of the HPA axis and decreases in GSW as a result of the event. Since the HPA axis and GSW are more proximal mechanisms for later adjustment difficulties, these findings provide insight into the pathways by which friendships provide protection against adjustment difficulties that result from negative events.

References

Adams, R. E., & Bukowski, W. M. (2007). Mothers and peers as moderators of the links between childhood sexual abuse and anxiety disorders. *Child Abuse & Neglect, 31,* 645–656. doi:10.1016/j.chiabu.2006.12.011

Adams, R. E., & Bukowski, W. M. (2008). Peer victimization as a predictor of depression and body mass index as mediated by self-perception of physical appearance in obese and non-obese adolescents. *Journal of Child Psychology and Psychiatry, 49,* 858–866. doi:10.1111/j.1469-7610.2008.01886.x

Burke, H. M., Davis, M. C., Otte, C., & Mohr, D. C. (2005). Depression and cortisol responses to psychological stress: A meta-analysis. *Psychoneuroendocrinology, 30,* 846–856. doi:10.1016/j.psyneuen.2005.02.010

Cicchetti, D., & Rogosch, F. A. (2001). Diverse patterns of neuroendocrine activity in maltreated children. *Development and Psychopathology, 13,* 677–693. doi:10.1017/S0954579401003145

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130,* 355–391. doi:10.1037/0033-2909.130.3.355

Egan, S. K., & Perry, D. G. (1998). Does low self-regard invite victimization? *Developmental Psychology, 34,* 299–309. doi:10.1037/0012-1649.34.2.299

Garber, J., Robinson, N. S., & Valentiner, D. (1997). The relation between parenting and adolescent depression: Self-worth as a mediator. *Journal of Adolescent Research, 12,* 12–33. doi:10.1177/0743554897121003

Gue´chot, J., Le´pine, J. P., Cohen, C., Fiet, J., Lempe´rie`re, T., & Dreux, C. (1987). Simple laboratory test of neuroendocrine disturbance in depression: 11 pm saliva cortisol. *Neuropsychobiology, 18,* 1–4. doi:10.1159/000118384

Hodges, E. V. E., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). The power of friendship: Protection against an escalating cycle of peer victimization. *Developmental Psychology, 35,* 94–101. doi:10.1037/0012-1649.35.1.94

Holsboer, F. (2000). The corticosteroid receptor hypothesis of depression. *Neuropsychopharmacology, 23,* 477–501. doi:10.1016/S0893-133X(00)00159-7

Miller, G. E., Chen, E., & Zhou, E. S. (2007). If it goes up, must it come down? Chronic stress and the hypothalamic-pituitary-adrenocortical axis in humans. *Psychological Bulletin, 133,* 25–45. doi:10.1037/0033-2909.133.1.25

Prinstein, M. J., Boergers, J., & Vernberg, E. M. (2001). Overt and relational aggression in adolescents: Social-psychological adjustment of aggressors and victims. *Journal of Clinical Child Psychology, 30,* 479–491. doi:10.1207/S15374424JCCP3004_05

Schwartz, D., Dodge, K., Pettit, G., Bates, J. E., & the Conduct Disorders Prevention Research Group. (2000). Friendship as a moderating factor in the pathway between early harsh home environment and later victimization in the peer group. *Developmental Psychology, 36,* 646–662. doi:10.1037/0012-1649.36.5.646

Stein, J. A., Leslie, M., & Nyamathi, A. (2002). Relative contributions of parent substance use and childhood maltreatment to chronic homelessness, depression, and substance abuse problems among homeless women: Mediating roles of self-esteem and abuse in adulthood. *Child Abuse & Neglect, 26,* 1011–1027. doi:10.1016/S0145-2134(02)00382-4

Sullivan, H. S. (1953). *The interpersonal theory of psychiatry.* Oxford, England: Norton and Co.

Trickett, P. K., Noll, J. G., Susman, E. J., Shenk, C. E., & Putnam, F. W. (2010). Attenuation of cortisol across development for victims of sexual abuse. *Development and Psychopathology, 22,* 165–175. doi:10.1017/S0954579409990332

Troop-Gordon, W., & Ladd, G. W. (2005). Trajectories of peer victimization and perceptions of the self and schoolmates: Precursors to internalizing and externalizing problems. *Child Development, 76,* 1072–1091. doi:10.1111/j.1467-8624.2005.00898.x

Vaillancourt, T., Duku, E., Decatanzaro, D., MacMillan, H., Muir, C., & Schmidt, L. A. (2008). Variation in hypothalamic–pituitary–adrenal axis activity among bullied and non-bullied children. *Aggressive Behavior, 34,* 294–305. doi:10.1002/ab.20240

Table 1

Results for the Multilevel Models for Cortisol and Global Self-Worth

	Salivary cortisol (logged)				Global self-worth			
	Change over time		Full model		Change over time		Full model	
Predictor	Coeff	*t* ratio	Coeff	*t* ratio	Coeff	*t* ratio	Coeff	*t* ratio
Intercept	.121	13.43	.120	13.21	4.13	42.30	4.20	38.67
Day	.012	5.27	.012	5.11	.008	.47	.006	.37
Time of day	.019	15.95	.019	14.78	.015	1.06	.011	.75
Time of day squared	.002	12.59	.002	11.65	.002	1.26	.002	1.04
Negative experience			.002	1.51			.028	1.26
Friend present vs. not present			.001	.22			.026	1.42
Interaction: Negativity X Presence			.001	2.05			.045	2.45

Note. Coeff = unstandardized coefficient.
$p < .05$. $p < .001$.

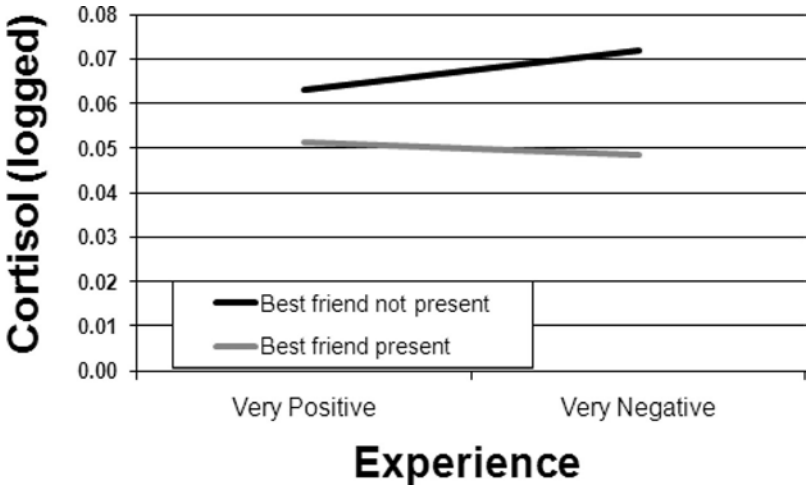

Figure 1. Associations between the negativity of the experience and changes in cortisol levels when a best friend was present and when the best friend was not present.

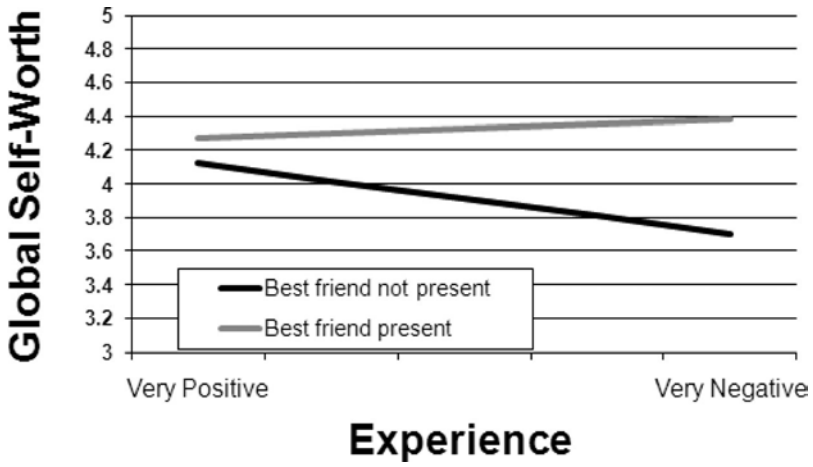

Figure 2. Associations between the negativity of the experience and changes in global self-worth when a best friend was present and when the best friend was not present.