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Oxytocin as a Moderator of Attachment Orientation and Forgiveness

Nicole Dryburgh*

Past studies have independently investigated the influence of oxytocin and attachment orientation on trust. The current study will attempt to bridge the gap between these two literatures by investigating the possible moderating role of oxytocin on attachment orientation and forgiveness. After a dose of oxytocin or a placebo, participants will provide information regarding their attachment orientation as well as their propensity to forgive a partner who has committed infidelity. It is predicted that, in the control condition, the low avoidance individuals will be more likely to forgive than the high avoidance individuals. This difference is expected to disappear when oxytocin is administered, as high avoidance individuals will become more likely to forgive. It is also predicted that the high anxiety individuals will be more likely to forgive than low anxiety individuals in the control condition. This difference is also expected to disappear when oxytocin is administered, such that low anxiety individuals will increase to the level of high anxiety individuals in regards to forgiveness propensity. These predictions are based on evidence suggesting that lower levels of avoidance and higher levels of anxiety both lead to the production of behaviour that serves to maintain a relationship status (a function that is also served by forgiveness). The predictions are also based on evidence that shows oxytocin is likely to increase trust and pair-bonding behaviour. The results of this study will serve to extend the current literature on oxytocin and relationship maintenance.

There are a number of factors, such as the evolutionary past of humans, the development of cultures, and the biology of humans that have shaped the way that people bond in romantic relationships. Numerous studies have been conducted to investigate the elements that play a role in maintaining monogamous relationships. One intriguing, yet somewhat inconsistent, line of research is based around the hormone and neurotransmitter oxytocin.

The existing literature on oxytocin has demonstrated a relation between the hormone and the variables of social behaviour, pair-bonding, and trust. Given the importance of pair-bonding and trust in romantic relationships, many researchers have proposed that oxytocin may serve to maintain monogamous relationships (Ditzen et al., 2009; Domes et al., 2007; Schneiderman, Zagoory-Sharon,

Leckman, and Feldman, 2012), though few have directly studied oxytocin in regards to romantic relationships. In addition, the attachment orientation variables of avoidance and anxiety have been shown to influence trust in romantic relationships (Colburn & Heisler, 2006). Therefore the current study will investigate the influence of oxytocin and attachment orientation in response to a significant breach of trust in a relationship: an act of infidelity. Of particular interest is the extent to which these variables will influence one's likelihood to forgive a partner's infidelity.

Oxytocin and Social Behaviour

Oxytocin has been shown to exert influences on social behaviour in humans and animals. Specifically, a few studies have shown that oxytocin may facilitate social approach behavior, or the motivation to approach others

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and initiate contact, in humans. Guastella, Mitchell, and Dadds (2008) studied this idea by administering oxytocin to male participants and tracking their eye-gaze while they viewed pictures of faces. After giving half of the males a dose of intranasal oxytocin and the rest of the males a placebo, the researchers presented neutral faces of males and females. While the participants viewed the faces, the researchers were able to track their eye movements and record where they looked and for how long. The results showed that participants who received a dose of oxytocin gazed longer and more frequently at the eye region of the presented faces when compared to the placebo group (Guastella et al., 2008). Therefore, the researchers proposed that the effects of oxytocin might serve to facilitate social approach behaviour in this way, as a person's eyes are known to supply information that is critical for social communication. In particular, the eyes provide information regarding emotion, interest, and potential threat (Guastella et al., 2008).

One mechanism underlying the differential locations of eye-gaze in the previous experiment may be a reduction in social anxiety due to increased oxytocin (Bartz, Zaki, Bolger, & Ochsner, 2011). Domes et al. (2007) demonstrated this notion by studying oxytocin's effects on the brain using functional magnetic resonance imaging (fMRI). The researchers presented participants with pictures of people's faces that displayed the emotion of anger, fear, or happiness. Participants were simply required to view the pictures and indicate whether the person was a man or a woman. Half of the participants received a dose of intranasal oxytocin beforehand, and half of the participants received a placebo. The results showed that when participants viewed faces that displayed any type of emotion, there was a higher activation of the right amygdala as compared to when they viewed a neutral face. However, this activation did not occur in the participants that received a dose of oxytocin. The researchers concluded that the absence of activation in the right amygdala in those participants that received a dose of oxytocin lends support to

research that suggests there may be stress-reducing and anxiety-reducing effects of oxytocin (Domes et al., 2007). Domes et al. (2007) went on to propose that their results may indicate that oxytocin produces a social facilitating effect, leading individuals to engage in more social approach behavior by inhibiting the activation of brain regions associated with social anxiety.

Oxytocin and Pair-Bonding

Oxytocin has been shown to increase behaviours that may help facilitate social approach, and research has specifically investigated behaviours relating to romantic or interpersonal relationships. Research suggests that oxytocin may play a role in facilitating not only social approach behaviour, but also the tendency to maintain monogamous relationships. Scheele et al. (2012) investigated whether the relationship status of heterosexual male participants would moderate the effects of oxytocin on social distance. The researchers administered an intranasal dose of oxytocin to half of the males and a placebo to the rest, and then had all of the participants engage in a stop-distance paradigm. The stop-distance paradigm consists of the participant standing at one side of the room and the experimenter at another. The experimenter or participant begins to move toward the other person, and the participant is asked to indicate when the degree of personal space between the two becomes uncomfortable. The results showed that oxytocin did not have an overall effect on the ideal distance for participants. Instead, the men in relationships reported discomfort at a larger distance than single men when they had received a dose of oxytocin (Scheele et al., 2012). These effects were even larger when the participant was the one moving. The researchers proposed that the administration of oxytocin in place of a placebo increased the desire for men to maintain their monogamous relationships, as evidenced by the increased distance at which these men reported discomfort when given oxytocin. This conclusion was supported by the fact that the effects of oxytocin appeared to disappear when the experimenter in the stop-distance paradigm

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was male. Therefore, oxytocin may serve to facilitate the maintenance of monogamous bonds in humans.

Further support for the idea that oxytocin may help to maintain monogamy has been found through use of correlational designs. Schneiderman et al. (2012) investigated the level of naturally occurring (plasma) oxytocin in people who were either at the beginning stages of a romantic relationship or not romantically attached. The researchers had participants come into the lab and give blood samples, after which single participants were dismissed. The romantic couples were interviewed separately and then taped while having a discussion about a positive experience they had shared (Schneiderman et al., 2012). The researchers coded the videotapes for “interactive reciprocity”, which includes aspects such as, “positive affect, interpersonal focus, affectionate touch, dyadic reciprocity, and matching of emotional state” (Schneiderman et al., 2012, p. 1279). The results showed that there were significantly higher levels of plasma oxytocin in people that were in a new relationship compared to people that were single. They also demonstrated that higher levels of oxytocin were associated with more interactive reciprocity behaviour. In addition, they found that levels of initial oxytocin could moderately predict the couple’s relationship status after six months, though the predictive effect was not very strong. Schneiderman et al.’s (2012) study showed that oxytocin is related to behaviour such as interactive reciprocity, that is beneficial to, and facilitative of, monogamous relationships.

Another study investigated the role of oxytocin in couple discussions. Instead of having couples discuss a positive experience, as Schneiderman et al. (2012) had done, Ditzen et al. (2009) watched couples while they discussed a relationship conflict. The researchers gave half of the couples an intranasal dose of oxytocin, and the other half a placebo. Couples were then asked to discuss a continuing conflict in the relationship for ten minutes. Blind judges rated the videotape of each couple for positive and

negative behaviour. The results showed that the administration of oxytocin significantly increased the amount of positive behaviour compared to the amount of negative behaviour performed by the couples (Ditzen et al., 2009). Furthermore, after studying saliva samples taken after the conflict discussion, the researchers noted that the couples that received oxytocin showed a decrease in cortisol after the conflict discussion was over, while the placebo participants did not (Ditzen et al., 2009). Cortisol is known as a stress-hormone, therefore a decrease in cortisol suggests a reduction in stress. The study by Ditzen et al. (2009) presents further support for the notion that oxytocin functions to facilitate behaviours that are helpful in maintaining monogamous bonds, such as increased positive behaviour and reduced stress after conflict discussions.

A number of animal studies have been performed to test the effects of oxytocin on pair-bonding behaviour in non-humans. The reduced ethical restrictions regarding the use of animals in these experiments allows researchers to go beyond simply studying facilitating behaviour, as they can study actual bond formation as a result of administering oxytocin. Insel and Hulihan (1995) conducted a set of studies to assess the effects of oxytocin in prairie voles, a known monogamous species. In the first study, the researchers administered oxytocin to female prairie voles, and then placed them with a male for several hours to mate. Afterwards, the voles were put in an area with both the original male and a novel male. The results showed that, compared to voles that received vasopressin or cerebrospinal fluid, the voles that received oxytocin spent significantly more time with the original male than with the stranger (Insel & Hulihan, 1995). The second study by Insel and Hulihan (1995) demonstrated that blocking oxytocin in the female prairie voles had the opposite effect, making the voles less likely to develop a partner preference, even though their level of activity remained the same. Taken together, these two studies support the notion that oxytocin functions in animals in a way that helps establish, and perhaps maintain,

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monogamous pair-bonds. Although this research was not carried out on humans, the results can be compared to existing literature on oxytocin and pair-bonding behaviour in people. By doing so, one can see that there is converging evidence to suggest that the hormone may facilitate monogamy in humans and non-humans alike.

Oxytocin and Trust

Not only has research shown that oxytocin can increase behaviours related to pair-bonding, but it has been shown to exert effects on a specific behaviour that is crucial to relationships: trust. Kosfeld, Heinrichs, Zak, Fischbacher, and Fehr (2005) directly examined the effect of oxytocin on trust in social interactions. The researchers administered either intranasal oxytocin or a placebo to participants. The participants were then involved in a trust game, where they were to invest any amount of money by transferring it to another participant. The other participant, the “trustee”, then had the option of sharing this money with the investor or keeping it for himself or herself. Therefore, the game involves trust and risk aversion on behalf of the investor. The results showed that participants who had received a dose of oxytocin invested significantly more money, and therefore showed greater trust in the other person than those in the placebo condition (Kosfeld et al., 2005). The effect was specific to cases of human social interaction, as when the other participant was replaced with a computerized mechanism, oxytocin did not have an effect on the amount of money invested in the game (Kosfeld et al., 2005). Therefore, oxytocin was shown to increase the likelihood of trusting another person during a social interaction.

Building on the research by Kosfeld et al. (2005), another group of researchers studied a possible reason for the increase in trust by investors in the risk aversion game. Klackl, Pfundmair, Agroskin, and Jonas (2013) proposed a model to predict how a participant might make different attributions for a trust betrayal. Klackl et al. (2013) suggested that the presence of oxytocin should increase the

likelihood of a person developing non-personalistic attributions of the behaviour as opposed to personalistic attributions. Non-personalistic attributions involve assuming the behavioural cause to be due to external factors, while personalistic attributions involve attributing the cause of the behaviour to personal factors (Klackl et al., 2013). According to the researchers, non-personalistic attributions are to be seen as more prosocial in the context of interpersonal conflicts or negative events (Klackl et al., 2013).

After administering either oxytocin or a placebo to participants, Klackl et al. (2013) had them engage in a trust game similar to that used by Kosfeld et al. (2005). One difference in the game was that the participants were informed after six rounds about their partners’ responses to the investments. All participants were told that the partner was not very trustworthy, and then the participants completed another six rounds. The results of the experiment showed that, while overall investments did not differ between the oxytocin and placebo groups, the administration of oxytocin led to an increase in non-personalistic attributions as the participant experienced angry rumination, such as thinking about the partner’s actions over and over. Therefore, oxytocin may cause people to attribute negative interpersonal events to external factors more often than personal factors, a result that has implications for conflict management in close relationships.

A study by De Drue (2012) demonstrated that oxytocin might influence trust in a way that is modulated by certain contextual factors. The researcher first assessed attachment anxiety and attachment avoidance, and then had half of the participants receive intranasal oxytocin and gave the other half a placebo. The male participants were then involved in an incentivized social dilemma where, on a number of trials, they decided whether or not to cooperate with another participant (really a computer) for monetary payoffs (De Drue, 2012). The results showed that oxytocin had differential effects on trust based on specific attachment orientation. For participants who

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received a placebo, low attachment avoidance individuals cooperated more often, reported being more trustful, and reported less betrayal aversion in comparison to the high attachment avoidance participants. These effects disappeared when oxytocin was administered, such that avoidance was no longer associated with differential outcomes on cooperation, trust, or betrayal aversion (De Drue, 2012). Therefore, the high attachment avoidance individuals showed increased levels of trust when oxytocin was administered such that they did not differ compared to the low attachment avoidance individuals. These results suggest that oxytocin may interact with personal factors, such as attachment orientation, in order to affect a person's level of interpersonal trust.

Attachment and Forgiveness

While oxytocin has been shown to influence a number of factors in a romantic relationship context, another extensively researched variable related to romantic relationships is attachment orientation. Attachment orientation has been shown to influence trust, which is an important element in interpersonal relationships and is related to the current variable of interest: forgiveness (Berry, Worthington, Parrott, O'Connor, & Wade, 2001; McCullough et al., 1998). A few studies have attempted to investigate how attachment orientation relates to forgiveness after a trust betrayal in romantic relationships. Most of the research in this area has been correlational, such that participants are asked to indicate their attachment style, and then are asked about the amount of forgiveness they tend to give in response to offenses in their relationships (Kachadourian, Fincham, & Davila, 2004; Lawler-Row, Younger, Piferi, & Jones, 2006; Webb, Call, Chickering, Colburn, & Heisler, 2006). Each of these studies use the Relationship Questionnaire (Bartholomew & Horowitz, 1991), and each of these studies have found that securely attached individuals forgive more often than insecurely attached individuals.

To the knowledge of the current researcher, there has been very little research

completed on the effects of attachment on forgiveness using the two broad attachment dimensions of attachment avoidance and attachment anxiety. These two dimensions are believed to provide accurate interpretations of adult attachment processes (Mikulincer & Florian, 1995; van IJzendoorn, 1995; Collins, 1996; Lemay and Dudley, 2011). In addition, the discussed research has relied on retrospective accounts of the amount of forgiveness in a relationship instead of measuring the likelihood to forgive in specific situations. The current research will attempt to fill these gaps in the literature on attachment and forgiveness in romantic relationships, as well as study the relation of attachment and oxytocin.

The Present Research

As previous research has approached the study of the effects of oxytocin and attachment orientation separately, the current study will investigate the possible relation between these two variables, as well as their possible combined influence on trust. In regards to oxytocin, the current study will attempt to fill the gap in the psychological literature regarding the effects of this hormone in the context of interpersonal relationships. Thus far, research has demonstrated that oxytocin is likely to promote monogamous relationships due to its apparent facilitation of behaviours related to pair-bonding. Research has also demonstrated that oxytocin can have positive impacts on the prosocial behaviour of trust, while being moderated by certain contextual factors. Although previous research is often used to imply consequences for oxytocin in romantic relationships, very little research has actually studied the effects in a relationships setting. The current research will attempt to provide clear evidence for the applicability of the findings regarding oxytocin to romantic relationships.

A great deal of research, including the studies previously discussed, has shown that trust is an important element of romantic relationships (Campbell, Simpson, Boldry, & Rubin, 2010; Holmes & Rempel, 1989; Schneider, Konijn, Righetti, & Rusbult, 2011).

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Forgiveness is also highly related to interpersonal trust. An extreme example of a behaviour that involves trust and forgiveness in romantic relationships is infidelity. While there has been some research focused on differences in reactions to infidelity (Berman & Frazier, 2005; Harris, 2000), there seems to be no research to this point examining the effects of oxytocin on these reactions. The current study will attempt to integrate past research in order to show that oxytocin modulates the effect of attachment orientation on reactions to a partner's infidelity. Specifically, the current research will investigate the likelihood of people with different attachment orientations to forgive infidelity, and will determine whether this is moderated by the administration of oxytocin.

Based on past research, there are a number of hypotheses that can be derived for the current study. It is hypothesized that the effects of oxytocin on forgiveness for different levels of avoidant attachment should be similar to those found by De Dreu (2012). Therefore, participants low on avoidance should forgive a trust betrayal more than participants that are high on avoidance. These effects should be minimized or disappear with the administration of oxytocin. Furthermore, the current research will attempt to investigate trust betrayal and forgiveness along the attachment anxiety dimension as well. Although the rationale behind these hypotheses is less immediately clear, it is hypothesized that participants low on attachment anxiety will be less likely to forgive than those high on attachment anxiety. As individuals higher in attachment anxiety are often more attentive to signs of their partner's distress, researchers propose that they may have higher anxiety about a partner leaving and a relationship ending (Monin, Feeney, & Schulz, 2012). Therefore high anxiety individuals may be more willing to forgive their partner for a wrongdoing in order to stay in the close relationship. In addition, when oxytocin is administered these effects should disappear, such that low anxiety individuals show an increased likelihood to forgive and high anxiety individuals do not differ from the placebo

condition. These hypotheses are derived from theoretical accounts suggesting individuals that are high on attachment anxiety are more worried about relationship conflict and more concerned with maintaining a positive relationship status (Collins, 1996; Hazan, & Shaver, 1987).

Method

Participants

The current study will attempt to recruit approximately 160 female undergraduate students at The University of Western Ontario. There will be exclusion criteria such that participants must not have any medical or psychological illnesses, allergies, intolerance to drugs, or be on permanent medication. Participants will also be excluded if they smoke or abuse drugs or alcohol. It will be explained prior to sign-up that these substances may propose dangers in the current study and therefore honesty in regards to these guidelines is important. The exclusion criteria are to ensure the safety of participants before administering oxytocin, as suggested by previous studies employing oxytocin (De Dreu, 2012; Klackl et al., 2013). Participants must also be currently involved in a romantic relationship in order to participate in the study. Students will receive credit for their participation in order to meet expected course requirements for a first year psychology course.

Procedure

Participants were informed upon signing up for the study about the involvement of administering hormones, and of the protocol required beforehand. They were instructed not to eat or drink anything for up to two hours before the start of the experiment, although they were allowed to drink water. They were also instructed not to drink alcohol, use caffeine, or exercise for up to 24 hours prior to the experiment (Klackl et al., 2013).

Participants arrived in the waiting room at the time of the experiment, and were greeted by the experimenter. The experimenter led the participants into the experimental room, where

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they were informed that the purpose of the experiment was to investigate the effects of hormones on judgment. Participants were provided with a letter of information, which briefly described the tasks involved in the study. Participants were told that their participation in the study was completely voluntary, and that they were free to leave at any time without the risk of losing compensation. Informed consent was then obtained.

All participants completed the measurement of attachment orientation upon arrival to the lab. Participants also completed a number of demographics questions such as age, gender, and first language. All of these tasks were completed on the computer.

Participants were randomly assigned before arriving to the lab to either the oxytocin condition or the placebo condition. Regardless of the condition they were assigned to, an experimenter supervised participants while they self-administered an intranasal spray to ensure compliance. Participants then completed an unrelated computer task for 40 minutes, which was believed to be sufficient time for the effects of oxytocin to reach a plateau (Baumgartner et al., 2008).

After 40 minutes, the computer automatically switched to the task of interest. The procedure for the scenario-envisioning task is outlined here, and is based on the procedure used by Buss et al. (1992). Participants were asked to read a scenario, and picture it as though it was real, as accurately as possible. They were told to think of the feelings and responses they would have in response to the scenario, and to continue to envision these feelings and responses for five minutes. Participants were then presented with one paragraph at a time describing a specific scenario. The first scenario was a practice trial that was relatively neutral (such as walking to class). As soon as the participant could clearly envision the scenario, they pressed a key to signal to the computer to begin counting down from five minutes. After five minutes, the computer presented a number of questions about the particular scenario.

Participants then had a one-minute rest period, after which the computer changed to the first target scenario. The same process was repeated, and then they were shown the second target scenario (the scenarios of interest are described in detail in the materials section). Participants then answered questions related to forgiveness and trust.

After completion of the study, participants were completely debriefed, given credit for their participation, and dismissed.

Materials

Demographics. Participants were asked several demographics questions, such as age, gender, and first language. They were also asked questions regarding the current relationship that they were in, such as whether or not there had been instances of infidelity or trust betrayal.

Attachment. The measure of attachment that was used in the current study was the revised 18-item Adult Attachment Style questionnaire (Collins, 1996). Following from De Drue (2012), the 12 items assessing attachment avoidance were averaged to form a measure of avoidance, and the remaining items were averaged to form a measure of attachment anxiety. Measures on this scale assess a person's comfort with closeness, comfort depending on others and providing support, and worries regarding rejection and abandonment by others (Collins, 1996).

Oxytocin. The participants self-administered either a single dose of oxytocin (24 IU, 3 puffs per nostril, as per De Drue, 2012) or a placebo spray, which contained all of the ingredients that were active in the oxytocin solution except the neuropeptide itself.

Infidelity Scenarios. The target scenarios read as follows (taken and slightly adapted from Buss et al., 1992):

Please think of the committed romantic relationship you are currently in. Now imagine that the person with whom you're seriously involved becomes

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interested in someone else. [*Imagine you find out that your partner is having sexual intercourse with this other person*] vs. [*Imagine that your partner is falling in love and forming an emotional attachment to that person.*] Try to feel the feelings you would have if this happened to you. (p. 253)

The use of both the sexual infidelity and emotional infidelity scenarios served to provide an overall measure for responses to infidelity. After each scenario was presented, participants were asked a number of questions regarding their hypothetical responses (see Appendix).

Anticipated Results

A number of variables will first have to be interpreted before the results can be analyzed. First, the responses to the two infidelity scenarios (emotional and sexual) will be analyzed in order to see if responses are highly correlated. If responses are highly correlated, then an average score will be compiled on each question in order to use in the analysis.

The anticipated results of the study are depicted in Figure 1 and Figure 2. As Figure 1 shows, participants are expected to vary in the likelihood of forgiveness in the placebo condition due to the moderating effects of attachment avoidance. Therefore, participants low in avoidance will be more likely to forgive than participants high in avoidance. These effects should disappear when oxytocin is administered, such that both conditions will show an increase in forgiveness to the point that low avoidance and high avoidance individuals are equally likely to forgive their partner's infidelity. Figure 2 demonstrates the way in which attachment anxiety will moderate the effects of oxytocin on forgiveness. In the placebo condition, high anxiety individuals will be more likely to forgive than low anxiety individuals. In contrast, when oxytocin is administered high anxiety individuals will remain the same in terms of likelihood to forgive, but low anxiety individuals will show

an increased likelihood of forgiveness. As previously discussed, these anticipated results are rooted in previous research on the topics of attachment, trust, and oxytocin.

Discussion

The anticipated results will serve to advance the literature in social psychology in a number of ways. First, there will be evidence provided for the effects of different levels of attachment orientation – avoidance and anxiety – on forgiveness. Up until this point, research has only examined the two dimensions with respect to trust betrayal, but has neglected to examine reactions to these betrayals outside of economic investment games. Following from this, the current study will serve to extend the literature on individual differences in responses to infidelity. Thus, the results will provide further information for the maintenance of interpersonal relationships.

Furthermore, the application of oxytocin's effects to the area of romantic relationships is one that has been suggested by many researchers, but has been understudied until this point. By directly investigating oxytocin's effects on reactions to infidelity, the current research will provide evidence for some of the presumed applications of the hormone.

Limitations and Directions for Future Research

There are a number of limitations to the current study, many of which lead to possibilities for future research. The first limitation of the current study is the measure of attachment orientation that will be used. The Adult Attachment Style questionnaire (Collins, 1996) will be used in the current study in order to allow for a logical development of hypotheses based on previous findings in the area. This measure also allows the current study to investigate avoidance and anxiety separately; therefore the relation of each variable with forgiveness can be investigated. Although this measure allows the current study to investigate avoidance and anxiety separately, many

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previous studies use the Relationship Questionnaire (Bartholomew & Horowitz, 1991). Therefore, the current study may be limited in generalizability and comparison to previous research. Future research may benefit from studying either the two dimensions separately, or from employing a different measure of attachment style.

Another limitation in the current study was the employment of hypothetical situations involving infidelity. Many researchers have criticized the use of hypothetical situations in research on infidelity (Berman & Frazier, 2005; Sagarin, 2005), claiming that they may not provide accurate representations of real-life responses to this type of offense. The current study will benefit from the use of these hypothetical measures in order to determine whether the proposed relations exist under controlled conditions. If the proposed relations are found, then future research may extend these findings by exploring and examining responses to infidelity in real life. For example, researchers could measure plasma oxytocin in participants who have recently been a victim of infidelity, and determine whether the level of oxytocin in an individual predicts the likelihood of forgiveness and/or reconciliation. Studies of real cases of infidelity would then extend the current study and provide further evidence of participants' responses to betrayal.

Another limitation to the current study is the use of only female participants. Past research has shown that gender differences have been found in relation to both oxytocin and infidelity reactions (De Vries, Panzica, 2006; Berman & Frazier, 2005). The current study used only female participants in order to avoid the possible confound of gender, and to allow for an easier extension of previous research on infidelity, which has typically studied only females. Future research could benefit from extending the results of the current study by determining whether gender differences exist in the modulatory effect of oxytocin on attachment and forgiveness.

Implications

The current study will provide important information that will not only extend research in the field of psychology, but will have implications for romantic relationships and counseling. The results will provide evidence for the idea that people of different attachment orientations respond to betrayal in relationships in different ways. Therefore, the means to assist them in their recovery from betrayal may differ depending on individual differences. Furthermore, the current study may help to explain a seemingly inconsistent finding in previous studies. Although oxytocin is related to many forms of positive social behaviour, it is also related to distress and negative emotions in the context of romantic relationships (Holt-Lunstad et al., 2008; Marazziti et al., 2006; Tabak et al., 2011; Taylor et al., 2010). The current study will propose a possible reason for this increased distress in romantic couples. If higher levels of oxytocin make it more likely for a person to forgive a partner of a trust betrayal, then this may indicate the existence of more conflict and problems in a relationship. From this perspective, those higher in oxytocin are more likely to stay in relationships despite potentially harmful conflict. If this possibility is supported, then there could be further implications for the current study, which will extend to health problems related to psychological distress in romantic relationships.

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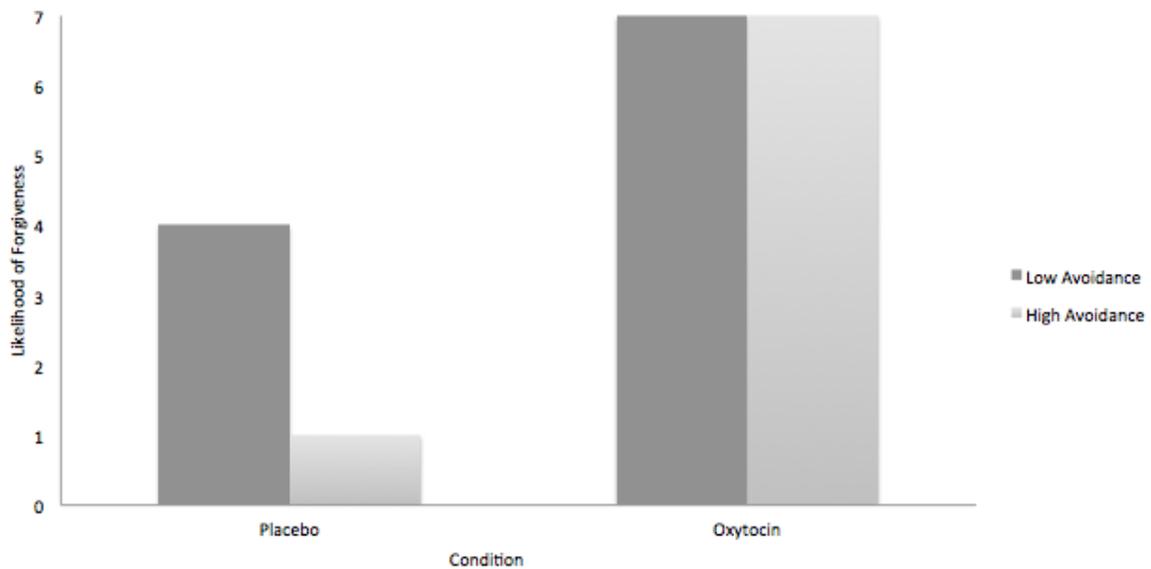


Figure 1. The anticipated likelihood that each participant will forgive a hypothetical act of infidelity by her partner after receiving intranasal oxytocin or a placebo, as a function of attachment avoidance.

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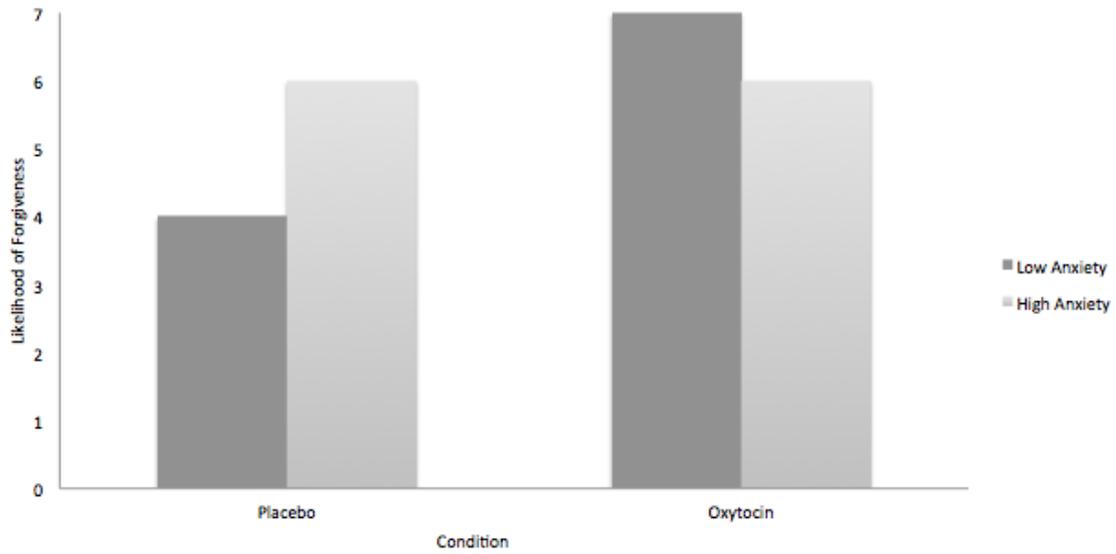


Figure 2. The anticipated likelihood that each participant will forgive a hypothetical act of infidelity by her partner after receiving intranasal oxytocin or a placebo, as a function of attachment anxiety.

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Appendix

Hypothetical Scenario Questionnaire (adapted from Buss et al., 1992)

Instructions.

Below are a series of statements with which you may either agree or disagree. For each statement, please indicate the degree of your agreement or disagreement.

1. “What is the likelihood that you would forgive your partner after discovering their actions and receiving an apology?”

1-7 scale, very unlikely to forgive - very likely to forgive

2. “How long would you be likely to wait before forgiving your partner after discovering their actions and receiving an apology?”

Type your response into the box provided

3. “How happy do you think would you be in the relationship if you were to forgive your partner?”

1-7 scale, very unhappy – very happy