Imitation of emotion
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Chapter 3

Are you angry at me?
The importance of meaning and direction when imitating emotion
Imagine that your friend is angry. If she is not angry at you, her anger will probably not affect the warmth of your relationship. Similarly, if you return her anger with an angry expression that is clearly not directed at her, your friendship is also likely to be unaffected. However, if she is clearly angry at you and you return her anger with an angry expression that is directed at her, mutual affection is likely to decrease. That is the hypothesis we will be testing in the present set of studies: When someone expresses anger toward you and because of you, imitating may decrease liking.

In context of the relevant literature this straightforward hypothesis may seem counterintuitive. Most studies on mimicry and imitation suggest that imitation will increase liking (Chartrand & Bargh, 1999; Stel & Vonk, 2008; Van Baaren, Holland, Kawakami, & Van Knippenberg, 2004). Mimicry has even been described as a ‘social glue’: “…the consistent link between behavioural mimicry and liking suggests that this behaviour may have ultimately evolved to serve a ‘social glue’ function, binding people together and creating harmonious relationships.” (Lakin, Jefferis, Cheng, & Chartrand, 2003, p. 147).

Although we are not contesting the idea that imitation may increase liking, we think it is important to note that the imitation-liking link is not ubiquitous. Previous research on mimicry and imitation has often focused on the imitation-liking link in the context of relatively simple, neutral behaviours. There are of course many forms of behaviour that can not be considered neutral. Research shows, for example, that emotions differ widely on whether they are seen by others as affiliative or non-affiliative (Hess, Blairy, & Kleck, 2000; Knutson, 1996). Happiness is usually intended as a way to encourage contact and is seen by others as highly affiliative, whereas anger is often expressed to discourage contact and show discontent and is typically seen as highly non-affiliative by others (Hess et al., 2000; Knutson, 1996). Even though imitation generally leads to more liking, it seems logical to argue that imitation of such inherently affiliative or non-affiliative behaviours may affect liking in a different manner.

**Imitation of emotional expressions**

What effect does the affiliative or non-affiliative aspect of emotion have on imitation? Imitation of more neutral behaviour generally leads to more liking and is often said to have an affiliative function (see Lakin et al., 2003). In that context the affiliative signals emotional behaviour may be sending are especially relevant. Behaviour that is inherently social, such as emotional expressions (Fridlund, 1994), can be expected to influence the affiliative function of imitation unlike behaviour that is not inherently social. When people imitate such meaningful behaviour they are not merely copying the behaviour. They are also sending the (non-) affiliative signal associated with that behaviour. Sending each other such (non-) affiliative signals can
obviously be expected to have an impact on how much people consequently like each other. Imitating a non-affiliative emotional expression such as anger will thus probably result in less liking. Both sender and observer are sending highly non-affiliative signals to each other cancelling out any positive effect that the mere act of imitation might have.

Such signals are often directed at a particular target or object, often a person or situation (Frijda, 1986). When studying the effects of emotions, it is thus relevant to consider the target of the emotion. The meaning and interpretation of the emotion may depend on whether it is directed toward the observer or at someone or something else. This is true especially for anger. Studies have shown that anger directed toward the perceiver is a clear threat for the perceiver and is more easily recognized, whereas anger directed away from the perceiver is more ambiguous and less easily recognized (Adams, Gordon, Baird, Ambady, & Kleck, 2003; Adams & Kleck, 2003). Furthermore, it has been shown that in negotiations anger is interpreted differently when it is directed toward people personally than when it is directed at their behaviour (Steinel, Van Kleef, & Harinck, 2007). We therefore argue that imitating a non-affiliative emotion will only result in less liking if the emotion was directed at the perceiver personally. If the anger is not directed at the perceiver personally the perceiver is imitating the same behaviour but because the signal is not directed at the perceiver personally the social message of discontent that is associated with the emotion will also not be directed at the sender. Imitating this behaviour can even have positive consequences because the imitation can be seen as empathic: ‘I feel the same way, I share your anger’.

If there is no imitation, we do not expect direction of the emotion to have an effect on liking. Some people might dislike someone that is angry at them, however, other people might have more of an inclination to feel guilty when someone is angry at them and will not take offence. Furthermore, someone who is angry at someone else is not necessarily more likeable than someone who is angry at the observer personally: it is just as likely that such a person will be equally disliked.

The direction of the anger does, nonetheless, give the observer information about how the anger should be interpreted. Other factors can do the same: situational factors such as specific facial features can also give people information about how a person’s expression should be interpreted. Facial features indicative of, for instance, gender, age, health, or dominance may be used to infer the meaning behind the expression. Gender has, for example, been shown to have an influence on how anger is seen: Anger is seen as especially non-affiliative when shown by men (Hess, et al., 2000). Men are also in general seen as more likely to act aggressively (Swim, 1994), and men are often seen as more aggressive than women, even when they show exactly the same angry behaviour (Harris & Knight-Bohnhoff, 1996). All of these known effects might make
people feel that when a man expresses anger, it is also a non-affiliative signal towards them, even though the direction of the anger might indicate otherwise.

Thus, when people think anger is directed at them we expect facial features indicating aggression will add to our expected effects of imitation: people will like the person even less. And even when anger is not directed at people personally we expect that people will nevertheless interpret the anger as a non-affiliative signal towards them when the anger is shown by a man and thus lead to less liking. In this case the stimulus itself gives information about how the emotion is to be interpreted.

The literature on imitation and mimicry often described these as the cement of society and as social glue (e.g., Lakin et al., 2003). Situations that enable imitation to have an adverse effect on liking should, therefore, lead to less mimicry. Thus, precisely because we expect imitating anger will have negative effects, we should also expect anger will generally not be imitated spontaneously. This makes it necessary to instruct people to imitate, in order to be able to study the effects of imitating such non-affiliative behaviour. In much of the previous research on imitation and liking, however, participants were unaware they were imitating (spontaneous imitation). This difference in methods could create a problem for comparing this research with past findings. However, recent research shows that intentional imitation does have similar effects on liking compared to spontaneous imitation (Stel & Vonk, 2008). Moreover, other studies comparing the two kinds of imitation suggest intentional imitation might actually be less likely to have an effect, making it a more conservative test of our hypotheses: Intentional imitation is slower and more effortful (Dimberg, Thunberg, & Grunedal, 2002), and intentional imitation is more sensitive to situational demands and cultural influences (Ekman, 1992).

In sum, we expect that people will like others less after imitation when the behaviour of the other is non-affiliative toward the imitator or when other factors, such as aggressive facial features, suggest the behaviour should be interpreted as non-affiliative. When the behaviour is not seen as non-affiliative or when the non-affiliativeness is not directed at the imitator, we expect imitation might even lead to more liking. When the emotion is not imitated, we do not expect any such target effects. We investigate these hypotheses in two studies. In both studies we looked at the impact of target of the emotion (is that person angry at me or not?) and imitation on liking. In Study 3.2 we also looked at how using an aggressive stimulus can influence the effect of target and imitation on liking.
Study 3.1

Method

Participants and design. One hundred and eight women and eighty three men participated in Study 3.1. The study had an imitation instruction (imitation, yes / no) versus target instruction (perceiver is target, yes / no) design with ‘first impression of the stimulus person’ as the dependent variable. Men and women were randomly assigned to the four conditions.

Material. The participants were shown a short video in which a woman’s facial expression changed from neutral to angry. For both studies we used computer generated faces (avatars) as stimulus material.

Procedure. Participants were told that they would look at and evaluate videos in order to test material for future research. They were also told that in order to prevent them thinking too much during the video, they would get specific assignments to carry out. In the imitation condition participants were asked to imitate the stimulus person. In the control condition participants were asked to just look at the video. All participants knew they were being recorded with a webcam in order to be able to check whether they were following our instructions.

All participants knew they would see an angry person in the video. Participants in the target condition were asked to imagine that this person was angry at them and participants in the non target condition were asked to imagine that this person was not angry at them. After the video the participants completed several questions including the main dependent measure. After that participants were asked what they thought the study was about and they were debriefed.

Dependent measure. To measure liking we used the question ‘what was your first impression of the person in the video’. Participants answered by dragging a marker on a line from negative to positive. The position on the line corresponded with a number between 1 and 100. We asked people about their ‘first impressions’ because we felt that directly asking about to what extent they “liked” the target would be likely to bias their responses in a positive direction (see Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Sudman, Bradburn, & Schwarz, 1996).

To give credibility to the cover story and to be able rule out or control for other explanations we asked several other questions, including questions about the video (“what was your first impression of the video itself”), perceived emotion (“How angry do you think the
person in the video is?”) experienced emotions (“Do you feel…?”) and experienced effort (“How easy did you think it was to (instruction)?”). For these measures the same scales were used as for the main dependent measure.

Results

Manipulation check. In order to determine whether the participants followed our imitation instruction we scored our webcam recordings on the presence and intensity of facial expressions. Because some participants disappeared out of view of the camera, we were able to score 171 of the total number of recordings. Two experienced judges, who were blind to conditions, independently scored the recordings on intensity of expressions, anger among others, on scales from 0 to 5 (a score of 0 was used when the expression was absent). To determine inter-rater reliability we computed intraclass correlations, using a two way random model and consistency definition (McGraw & Wong, 1996; Shrout & Fleiss, 1979). The score was .60 for anger, which is good according to the criteria specified by Cichetti and Sparrow (1981). We conducted an ANOVA with target instruction and imitation instruction as independent variables and the average of the judges’ score as the dependent variable. We found a significant effect of imitation on anger expressions, \( F(1,167) = 239.15, p < .001, \eta_p^2 = .59. \) Participants showed stronger anger expressions when they were asked to imitate, compared to when they were asked just to look (\( M = 2.12, SD = 1.17 \) vs \( M = 0.05, SD = 0.34 \)). This shows that participants did follow our instructions. There was no effect of target instruction on occurrence of imitation and no interaction, \( F's < 1. \) Other expressions than anger hardly occurred and did not occur in such quantities that analysis on these was possible.

Outlier Analysis. Next, we analyzed the results of target instruction and imitation instruction on liking of the stimulus. Analysis showed one outlier. This point deviated more than 1.5 Interquartile Range (IQR) from the mean. We excluded this point from further analyses. Results were comparable without removal of the outlier.

Effects on liking. We did an ANOVA with target instruction and imitation instruction as independent variables and liking as the dependent variable. In our analyses we also looked at the effect of participant gender. Because there were no participant gender effects (\( F's < 1 \)), we collapsed across this variable. In line with our expectations there was a significant interaction between target instruction and imitation instruction on the dependent variable liking, \( F(1,186) = 4.16, p = .043, \eta_p^2 = .02. \) See Table 3.1 for the means. Further analysis showed that when participants imitated the angry stimulus person they liked her less compared to the control condition when they imagined they were the target of the anger, \( F(1,186) = 4.44, p = .036, \eta_p^2 = .023. \) When they imagined they were not the target of the anger there was no effect, \( F < 1. \)
Table 3.1
First impression of the stimulus person as a function of imitation instruction and target instruction for Study 3.1.

<table>
<thead>
<tr>
<th></th>
<th>Imitation</th>
<th>Just Look</th>
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<tr>
<td><strong>Target Instruction</strong></td>
<td></td>
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<tr>
<td>Target</td>
<td>36.9, (22.1)</td>
<td>47.6, (27.6)</td>
</tr>
<tr>
<td>Non-target</td>
<td>48.8, (24.9)</td>
<td>45.0, (23.1)</td>
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Note: Scores are given on a scale from 1 (negative) to 100 (positive). The standard deviations are in parentheses. Means that do not share the same subscript are significantly different ($p < .05$).

Other variables. If there were differences in perceived anger of the stimulus these could have had an effect on liking independently of the interpretation of that anger. An ANOVA with ‘how angry do you think the person in the video was?’ as the dependent variable showed only a main effect for imitation instruction, $F(1,186) = 7.57, p = .007, \eta^2_p = .04$. When participants imitated the stimulus they thought she was less angry ($M = 64.2, SD = 20.4$) than when they had not imitated her ($M = 72.3, SD = 19.2$). This can not explain our interaction on liking however. Furthermore we analyzed the results controlling for this perceived anger and found the exact same interaction and pattern of means as before, $F(1,185) = 4.57, p = .034, \eta^2_p = .02$.

Participants own anger could also affect liking. If participants are angrier they might react more negatively to the stimulus. However there was only a main effect of target instruction on this variable, $F(1,186) = 5.92, p = .016, \eta^2_p = .03$. When participants imagined the person to be angry at them they were angrier ($M = 21.6, SD = 18.0$) then when they imagined the person not to be angry at them ($M = 15.6, SD = 15.4$). This cannot explain the interaction results we found. Also controlling for this variable still resulted in the same interaction and pattern of means, $F(1,185) = 4.15, p = .043, \eta^2_p = .02$.

Instruction difficulty might also have influenced liking. Perceived ease of performing the instruction did show an interaction, $F(1,186) = 5.28, p = .023, \eta^2_p = .028$. Participants thought imagining that the stimulus was angry at them was easier to do when they were not also asked to imitate ($M = 54.6, SD = 27.4$) compared to when they were asked to imitate ($M = 37.1, SD = 20.9$), $F(1,186) = 14.00, p < .001, \eta^2_p = .07$. The instruction to imagine that she was not angry at them was thought by participants to be equally easy whether they were asked to imitate ($M = 64.7, SD = 19.5$) or not ($M = 67.2, SD = 22.9$), $F < 1$. So the condition that was the most difficult, the combination of imitating and imagining the stimulus was angry at them, also showed the least liking for the stimulus. However controlling for perceived difficulty in the original ANOVA resulted in the same interaction and pattern of means as before, $F(1,185) = 4.15, p = .043, \eta^2_p = .02$. 
Discussion

The results of this study show that when studying the effects of imitation it is indeed important to keep in mind how this behaviour is interpreted. Imitating an angry expression has an effect when people imagine themselves to be the target but not when people imagine they are not the target.

As we noted earlier, non-emotional facial features may also be informative for the imitator and help to give meaning and evaluate a facial expression. That is why, for example, men are often seen as more aggressive than women, even when their (anger-related) behaviour is similar (Harris & Knight-Bohnhoff, 1996). Since such features might influence how the behaviour is seen and affect our results we wanted to take a closer look at our stimulus. We used a female stimulus in Study 3.1. Since a man is probably seen as more aggressive this could influence the results of target and imitation on liking.

To get a better idea of how women and men are seen when they are angry we did a pilot study with 67 participants. We examined how participants rate angry women and men on how aggressive and frightening they come across on scales from 1 (not at all) to 9 (very). We used the angry woman from Study 3.1 and a newly created angry man. Even though they were perceived as equally angry, $F(1,65) = 1.58, p = .21, \eta_p^2 = .02$, the angry man was seen by participants as more aggressive ($M = 7.41, SD = 1.16$) than the woman ($M = 6.48, SD = 1.30$), $F(1,65) = 9.50, p = .003$, $\eta_p^2 = .13$. The man was also seen as more frightening ($M = 7.09, SD = 1.16$) than the woman ($M = 5.64, SD = 1.83$), $F(1,65) = 15.06, p < .001, \eta_p^2 = .19$. So an angry man is indeed seen as more aggressive and more frightening than an angry woman. Thus compared to angry women, angry men possess facial features that are more likely to indicate aggressiveness. In Study 3.2 we will use a male stimulus to examine whether direction of anger is irrelevant when the stimulus is seen as very aggressive.

Study 3.2

In Study 3.2 we repeated Study 3.1 with the male stimulus we used in the pilot study. As angry men are perceived to be very aggressive, we expect this facial feature to influence our expected effects of imitation: people will like the person even less, independent of whether people think the anger is directed at them or not. Thus unlike Study 3.1, in which we used an angry woman, we expect only a main effect of imitation in Study 3.2, because an angry man is used as the stimulus.
Method

Study 3.2 had 69 female and 65 male participants. This time the stimulus person was a man. The rest of the study was identical to Study 3.1.

Results and discussion

Manipulation check. In order to determine whether the participants followed our imitation instruction we scored our webcam recordings on the presence and intensity of facial expressions. Because some participants disappeared out of view we were able to score 101 of the total number of recordings. Two experienced judges, who were blind to conditions, independently scored the recordings on intensity of expressions (anger among others) on scales from 0 to 5 (a score of 0 was used when the expression was absent). We computed the interrater reliability the same way as in Study 3.1. The score was .61 for anger, which is seen as good (Cichetti & Sparrow, 1981). We did an ANOVA with target instruction and imitation instruction as independent variables and the average of the judges score as the dependent variable. We found a significant effect of imitation on anger expressions, $F(1,97) = 59.74, p < .001, \eta^2_p = .38$. Participants showed stronger anger expressions when they were asked to imitate ($M = 1.38, SD = 1.31$) compared to when they were asked just to look ($M = 0.09, SD = 0.37$). So these participants did follow our instructions. Other expressions than anger hardly occurred and did not occur in such quantities that analysis on these was possible. There was no effect of target instruction on occurrence of imitation, $F(1,97) = 1.20, p = .28, \eta^2_p = .01$, and no interaction, $F < 1$.

Outlier analysis. Next, we analyzed the results of target instruction and imitation instruction on liking of the stimulus. Analysis showed three outliers. These points deviated more than 1.5 Interquartile Range (IQR) from the mean. We excluded these points from further analyses. Results were comparable without removal of the outliers.

Effects on liking. We did an ANOVA with target instruction and imitation instruction as independent variables and liking as the dependent variable. There was an effect of participant
Gender in these analyses, but this effect was not relevant for our hypotheses. There was no interaction between target instruction and imitation instruction on the dependent variable liking, $F < 1$. As expected, there was a main effect of imitation instruction, $F(1,127) = 5.90$, $p = .017, \eta^2_p = .04$. After imitation ($M = 29.4$, $SD = 21.8$) participants always liked the man less compared to no imitation ($M = 39.3$, $SD = 22.4$). In this case it did not matter if participants imagined themselves to be the target of the anger or not.

**Other variables.** Similar to Study 3.1 we wanted to rule out some alternative explanations. Difference in perceived anger was again not a suitable explanation. An ANOVA with ‘how angry do you think the person in the video was?’ as the dependent variable showed no effects for imitation instruction or target instruction, $F < 1$. As in Study 3.1 we analyzed the results controlling for this perceived anger and found the same main effect for imitation instruction, $F(1,126) = 7.24$, $p = .008, \eta^2_p = .05$. Participants’ own anger also turned out not to explain the results. Participants’ own anger only showed a main effect for target instruction, $F(1,127) = 4.93$, $p = .028, \eta^2_p = .04$. When participants imagined the person to be angry at them they were angrier ($M = 26.1$, $SD = 20.7$) than when they imagined the person not to be angry at them ($M = 17.6$, $SD = 17.5$). Controlling for this variable still resulted in the same main effect for imitation instruction, $F(1,126) = 5.74$, $p = .018, \eta^2_p = .04$.

Differences in difficulty of the task also did not explain our results. Perceived ease of performing the instructions showed a main effect of target instruction, $F(1,127) = 20.38$, $p < .001, \eta^2_p = .14$, and a main effect of imitation instruction, $F(1,127) = 6.06$, $p = .015, \eta^2_p = .05$. Participants thought imagining that the stimulus was not angry at them was easier to do ($M = 67.1$, $SD = 22.9$) than imagining the stimulus was not angry at them ($M = 48.7$, $SD = 22.9$). Participants also thought not imitating was easier to do ($M = 51.3$, $SD = 23.6$) than imagining the stimulus was not angry at them ($M = 31.5$, $SD = 25.4$). Controlling for this variable in the original ANOVA resulted in the same main effect of imitation instruction, $F(1,126) = 5.76$, $p = .018, \eta^2_p = .04$. This shows that our results once again cannot be easily explained by other factors.

These results show that indeed the facial feature indicating gender is important for the effects of imitation of anger. As expected we found that imitation led to less liking compared

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1 There was a main effect of participant gender on liking, $F(1,123) = 5.46$, $p = .021, \eta^2_p = .043$ and an interaction effect of participant gender and target instruction, $F(1,123) = 12.48$, $p = .001, \eta^2_p = .03$. Men liked the angry man more when they imagined he was not angry at them ($M = 46.0$, $SD = 23.8$), compared to when they imagined he was ($M = 34.8$, $SD = 23.8$), $F(1,125) = 4.40, p = .038, \eta^2_p = .02$. Women however liked the angry man less when they imagined he was not angry at them ($M = 24.2$, $SD = 17.3$), compared to when they imagined he was ($M = 38.3$, $SD = 20.5$), $F(1,125) = 6.91$, $p = .010, \eta^2_p = .05$. With participant gender as an independent variable in the ANOVA there was however still an effect of imitation on liking and no two-way or three-way interactions with imitation $Fs < 1$. Controlling for participant gender in the original ANOVA still resulted in the same main effect for imitation, $F(1,126) = 5.94$, $p = .016, \eta^2_p = .05$. The result for participant gender therefore did not affect our hypotheses.
to no imitation regardless of the target of the emotion. Presumably this was because the facial feature gave information about how the emotion was to be interpreted. In this case the anger was perceived to be unfriendly (aggressive) regardless of the target.

General discussion

Behaviour is meaningful and often has a communicative function. Emotional behaviour in particular is inherently social and communicative in nature. When people show emotions they often do this to let others know what they are feeling. Expressing anger, for example, is often a way to intimidate or show discontent. The present studies support the notion that when behaviour is meaningful, imitation will not always lead to increased liking of the one who is imitated. Specifically, imitating unfriendly behaviour, such as an angry frown, may lead to less rather than more liking.

Interestingly, this imitation-may-decrease-liking effect is contradictory to a host of recent social cognition studies of imitation effects (see Lakin et al., 2003 for an overview). The behaviour that was mimicked or imitated in previous studies, however, was often neutral or friendly. Contrary to these well-known imitation-increase liking studies, our studies show that imitating an unfriendly angry expression may increase disliking of the stimulus.

Furthermore, our studies suggest that subtle but meaningful target cues may change the impact of imitation on liking when such cues suggest how an angry expression may be interpreted. That is, we showed that exactly the same angry facial expression had an effect when people imagined themselves to be the target of this anger, but no effect when people imagined they were not the target, as we expected.

Finally, we showed that non-emotional facial cues may also determine the effect of imitation on liking. That is, the effects of target cues were only present when people imagined a woman to be angry or not angry at them. Study 3.2 showed that when the angry person was a man, target cues did not matter anymore: participants always liked the man less after they had imitated him. Here it seems the information that the face was male provided information on how the emotion should be interpreted (as aggressive regardless of the direction of the anger).

In our studies, we manipulated the meaning of emotional facial expressions by providing participants with the reasons or sources of the expressed emotion (‘she is angry at you’; ‘she is angry but not at you’). Gaze direction might have been another effective manipulation of whether or not the facial expression is directed at the observers. In the present research we did not choose to manipulate gaze direction, because we wanted to be able to control the meaning for the observers rather than leave the change in meaning up to the observers own
interpretations. This had the additional benefit of being able to keep the stimulus material identical across conditions.

We did not expect any spontaneous imitation of anger to occur, which made it necessary to study intentional imitation in our studies, to be able to study the limits of the imitation-liking link. However, because previous studies often used spontaneous imitation the possibility remains that the results were obtained merely because of the difference in imitation type. For instance, the fact that people were aware that they had to imitate the other person could have resulted in more people guessing the real purpose of the research and thus influencing the results. Our debriefing results, however, clearly did not show any such effects: people were completely unaware why they were asked to imitate. Furthermore, research suggests intentional imitation is likely to be an equal or more conservative choice than spontaneous imitation (Dimberg et al, 2002; Ekman, 1992; Stel & Vonk, 2008). Thus, although a comparison of the two forms of imitation in one design would be good, we nevertheless think based on the available literature that it is likely that spontaneous imitation of non-affiliative behaviour will also have a negative effect on liking, perhaps even stronger than the effect of intentional imitation.

An obvious distinction to investigate when looking at effects of imitation on liking is the distinction between non-affiliative and affiliative behaviour. And this distinction indeed proved to be very influential for the effects of imitation on liking. The present studies support the notion that since social behaviour is rarely meaningless, it is wise to take meaning of behaviour into consideration when studying the impact of imitation on social behaviour.

To conclude with some well-meant advice, when you want to be liked by others, imitating them is not always the best route to follow. Rather, you might be better of focusing on what the behaviour of the other conveys and how you can reply to this message in a meaningful and empathic way. Sometimes liking can be achieved by imitation, but sometimes life is more complex and it is better to choose a different approach.