

# Humour, Tickle, and the Darwin-Hecker Hypothesis

Christine R. Harris and Nicholas Christenfeld

*University of California, San Diego, USA*

Darwin (1872) and Hecker (1873) suggested that laughter induced by tickle and by humour share common underlying mechanisms. Seventy-two undergraduate students participated in a study designed to explore the relationship between the two phenomena. Subjects were tickled before and after viewing comedy and control videotapes. Subjects exhibiting more pronounced laughter to comedy also laughed more vigorously to tickle, extending and validating self-report findings of Fridlund and Loftis (1990). However, there was no evidence that comedy-induced laughter increased subsequent laughter to tickle nor that ticklish laughter increased laughter to comedy. We suggest that humour and tickle may be related only in that they share a final threshold for elicitation of their common behavioural response (smiling and laughter).

## INTRODUCTION

The similarity of the response to humour and to being tickled led Charles Darwin (1872/1965) to suggest that humour and tickle may have deep underlying commonalities. He noted that the physical responses to both humour and tickle include not only laughter but also convulsive motor actions and piloerection; that a pleasant hedonic state was a precondition to laughter in both cases; that the stimulus must be “light”—jokes cannot be of “grave import” and the physical touch in tickling must not be too heavy. Darwin also claimed that surprise is necessary for either jokes or tickle to produce laughter. One can no more tell oneself a joke than tickle oneself. Another theorist of Darwin’s time, Ewald Hecker (1873), also equated laughter from tickling and laughter from humour. According to Fridlund and Loftis (1990, p. 142), Hecker “regarded humorous laughter as a skilled psychological titillation which, in producing alternating pleasant

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Requests for reprints should be sent to Christine R. Harris, Department of Psychology 0109, University of California, San Diego, CA 92093, USA.

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and unpleasant states, was a tickle." However, neither Darwin nor Hecker offered empirical support for these intriguing hypotheses.

There are several levels at which humour and tickling might be related. People might simply have a threshold for emitting laughter that is shared by ticklish and humorous situations. A deeper connection, advocated by Hecker and Darwin, is that the stimulation giving rise to both is somehow similar. Fridlund and Loftis also suggest a deep connection: Tickling and humour both produce tension, which is then dissipated by laughter. It has also been suggested that jokes arise ontogenetically from tickling with psychological stimuli supplanting physical ones—essentially Darwin's (1872/1965) notion of humour as a serviceable associated habit. Finally, an even more profound connection is possible: It might simply be funny to be tickled.

Empirical work on the relationship of tickle and humour is almost non-existent. One study (Fridlund & Loftis, 1990) found that subjects who rated themselves high on ticklishness tended to rate themselves prone to smiling, laughing, and giggling. Noting the limitations of self-report data, Fridlund and Loftis conclude that these correlations support the Darwin-Hecker contention that tickling and humorous laughter are related. They offered an ontogenetic explanation for the correlation: Children may vary in their propensity to laugh when tickled, and parents of easily tickled children engage in more humorous play, thereby encouraging their offspring to laugh more readily to humour as well. Alternatively, the finding could simply reflect individual differences in a threshold for smiling and laughter responses, however elicited.

The present study explores the relationship between the responses elicited by tickling and by humour in two ways: examining whether the people who laugh at humour are the same ones who laugh when they are tickled and testing whether humour and tickling prime one another. The first uses behavioural measures in an attempt to extend Fridlund and Loftis' self-report findings. The second is motivated by work on emotional priming. In research on excitation transfer, Zillmann (1979) has shown that emotional reactivity in one situation tends to be carried over into new situations, resulting in increased emotional responsivity. In the specific case of humour, Martin (1905) showed that exposure to humorous pictures increased whereas exposure to sad pictures decreased subsequent humour responses. Deckers, Buttram, and Winsted (1989) found that subjects' ratings of funniness and their facial displays of humour increased over the first few cartoons of a series. This warm-up effect is presumably the reason that the best comedian at a comedy club always gets to perform last. If humour and tickle share a common underlying emotion (presumably mirth), then one might expect that watching a funny film should increase laughter and smiling to subsequent tickling and vice versa.

## METHOD

### Subjects

Forty-eight female and twenty-four male undergraduate students (ages 18–41, mean = 19.9, SD = 3.4) at the University of California, San Diego, participated for course credit.

### Apparatus and Materials

The neutral videotape—chosen to hold viewers' interest without being funny—was drawn from a television programme comparing human and animal locomotion (running time: 13 minutes, 53 seconds). The humorous tape consisted of clips taken from stand-up comic's routines and from "The Best of Saturday Night Live" (running time: 14 minutes, 2 seconds).

Subjects watched the videotape on a 26-inch colour monitor and listened to the soundtrack on headphones, allowing coders to remain blind to condition. A videocamera recorded subjects' facial expressions, body movements, and sounds.

### Research Assistants

Three female research assistants tickled the subjects. During training, they worked to ensure that their styles of tickling were as similar as possible. There was no effect of tickler on any dependent variable and data were collapsed across this variable.

### Procedure

A female experimenter conducted all sessions with the assistance of one of the female research assistants. Subjects were told that the study concerned aesthetic and physiological reactions to stimuli, including art reprints, a short film, and tickle. Subjects were asked to behave as naturally as possible and to report their own subjective impressions of the stimuli. After consenting to participate, subjects were presented with several art reprints and were asked to rate each on several dimensions. This portion of the experiment provided subjects with a few minutes to become comfortable with the researcher and the assistant in the laboratory environment and served to disguise the hypotheses being tested. The atmosphere was relaxed and informal. The researchers displayed pleasant expressions throughout the experiment and dressed in normal student attire.

Subjects were randomly assigned to one of three conditions: (1) comedy followed by tickle; (2) tickle followed by comedy; (3) control tape followed

by tickle. In the tickling phase, the subject was tickled simultaneously on both sides of the torso (from underarms to waist) three times. Subjects were then tickled three times on the right foot. Each tickling episode lasted for 10 seconds, followed by 10 seconds without tickling. Subjects were told they could interrupt the tickling if the sensation became intolerably intense. In the next phase, all subjects were tickled twice on eight different body parts, for five seconds each. This phase of the experiment was designed to provide an accurate individual ticklishness score, used to correlate ticklishness with humour responses and as a covariate in assessing the effects of the films on tickle.

## RESULTS

### Dependent Measures

After viewing the videotape, subjects rated the film using a 0–7 Likert-type scale, ranging from “not at all funny” to “extremely funny”. Behavioural measures of reactions to the tapes were scored from the videorecording of the subject viewing the film. The number of seconds that each subject spent laughing or smiling was coded (blind to condition).

After each tickling episode, subjects rated the intensity of tickle on a 0–7 Likert-type scale, ranging from “not ticklish at all” to “extremely ticklish”. Our dependent variable is the average of this rating across the tickling episodes. Behavioural responses were assessed by coders who viewed the videotapes of the tickling sessions, observing instances of smiling, laughing, wiggling, and terminating tickling. An aggregate behavioural tickling measure was created, combining time spent smiling, laughing, wiggling, or stopping the tickling across episodes.<sup>1</sup>

Subjects exhibited strong tickle responses. During the tickling episodes, they spent 43% of the time smiling, 16% laughing, 20% wiggling, and 6% finding it so intense that they asked it to be stopped. Self-reports of tickle averaged 3.5.

*Reliability of Measures.* To assess reliability of film response coding, 15 randomly selected subjects were scored by a second rater. The two ratings were correlated [ $r(13) = .91, P < .0001$ ]. Two independent ratings

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<sup>1</sup> None of the results changes when a tickle intensity scale is used and an average tickle score for each subject is computed (a scale similar to the one used by Hoshikawa, 1991). This measure correlates .91 with the duration measure that we use.

of 12 subjects' behavioural responses to tickle were correlated [ $r(10) = .98$ ,  $P < .0001$ ].

Self-reports of funniness and total time spent laughing and smiling were correlated [ $r(69) = .68$ ,  $P < .0001$ ]. (One subject was omitted here because of video failure.) For tickling, the correlation of self-reports and behaviour was [ $r(70) = .62$ ,  $P < .0001$ ].

*Gender Differences.* There was no gender effect on any dependent measure: Male and female subjects did not differentially respond to being tickled by a female. Similar results were obtained in another study using a female tickler (Harris & Christenfeld, submitted). Claxton (1975) also found no differences between tickle exhibited in mixed-sex and same-sex pairs. These observations question the seemingly plausible suggestion that ticklish laughter is related to erotic tension.

*Manipulation Checks.* Subjects watching the comedy spent more time laughing and smiling ( $M = 226.1\text{sec}$ ) than subjects watching the control film ( $M = 2.4\text{sec}$ ), [ $t(69) = 6.3$ ,  $P < .0001$ ]. The comedy was also rated as significantly more funny ( $M = 5.56$ ) than the control film ( $M = 1.42$ ), [ $t(70) = 13.2$ ,  $P < .0001$ ].

*Correlations of Humour and Ticklishness.* To examine whether Fridlund and Loftis' self-report data extend also to behavioural responses, we correlated the response to comedy with the response to tickle (restricted to the second part of the experiment, which is independent of film condition). The result was significant [ $r(46) = .39$ ,  $P < .02$ ]. It appears, therefore, that there are stable individual differences in the propensity to laugh when being tickled and when watching a comedy. Humour ratings of the comedy, however, showed no correlation with self-reports of ticklishness [ $r(46) = .04$ , n.s.]. The divergent findings between behaviour and self-report bear on the nature of the link between tickle and comedy, an issue discussed further later.

*Effects of Film on Ticklishness.* We examined the effects of having watched a humorous, a control, or no film on ticklishness, using an ANCOVA of film condition on behavioural ticklishness in phase one of the experiment. The behavioural tickle score from phase two was used as a covariate, because this provided a reliable measure of individual differences in ticklishness, thereby providing greater sensitivity in assessing the effect of film condition. This measure was a good covariate [ $F(1, 66) = 133.26$ ,  $P < .0001$  (the correlation between the two parts was  $r = .84$ )], but the ANCOVA revealed no effect of film condition on ticklishness [ $F(2, 66) = 0.26$ , n.s.]. The same ANCOVA was performed with self-report measures.

The covariate (self-reported ticklishness in phase two) was significant [ $F(1, 66) = 115.42, P < .0001$ ], but there was no effect of film condition on self-reported ticklishness in phase one [ $F(2, 66) = 1.26, n.s.$ ]. Table 1 presents actual means. In short, watching a funny film does not affect subsequent tickle as assessed either by behavioural or self-report measures.

*Effects of Ticklishness on Comedy.* The final analyses focused on the two groups that watched the comedy, and examined whether being tickled first made subjects laugh and smile more to the comedy. There was no difference in seconds spent laughing and smiling as a function of previous tickle [ $t(46) = 0.17, n.s.$ ], nor in funniness ratings [ $t(46) = 0.15, n.s.$ ]. Means are shown in Table 2. Having just been tickled did not make the comedy film funnier.

## DISCUSSION

The first finding of the present study confirms that there is a relationship between people's susceptibility to tickle and their predisposition to laugh and smile at comic stimuli. This provides behavioural support for Fridlund and Loftis' (1990) finding that self-reported ticklishness and proneness to humorous laughter are correlated across individuals. Although the correlation is of modest size, its size is well within the range of positive findings involving cross-situational measures (Mischel, 1968).

Why should ticklish responses be associated with humorous laughter? One possibility is that laughter is produced by the internal state of humour both when watching comic stimuli and when being tickled. Although this

TABLE 1  
Tickle Responses (Standard Deviations in Parentheses)

<i>Condition</i>	<i>Self-report</i>	<i>Behaviour (Secs)</i>
Comedy—Tickle	3.63 (1.95)	59.79 (37.76)
Tickle—Comedy	3.37 (1.58)	41.54 (31.19)
Nature—Tickle	3.45 (1.70)	46.67 (34.56)

TABLE 2  
Mean Humour Responses to the Comedy  
(Standard Deviations in Parentheses)

<i>Condition</i>	<i>Subject Ratings of Funniness</i>	<i>Laughing and Smiling (Sec)</i>
Comedy—Tickle	5.58 (1.18)	222.2 (178.4)
Tickle—Comedy	5.54 (0.78)	230.0 (162.4)

explanation is parsimonious, several aspects of the data suggest it is implausible. First, if the experience were the same, subjects' humour ratings of the comedy ought to have been correlated with self-reports of ticklishness. This was not the case. Second, subjecting people to humorous stimuli produced no increase in subsequent tickle sensation, and tickling people before they watched a comedy did not enhance their humour responses. If both situations produced a common state (e.g. mirth), some transfer of responsiveness from one situation to the other might have been expected, as has been found in other humour research. Our results therefore suggest, albeit tentatively, that tickling may produce laughter in a different way than do humorous stimuli.

Our subjects' introspections seem to support this interpretation. Despite agreeing to participate in a tickle study and despite smiling and laughing, most reported that they did not find the experience at all positive (e.g. one subject referred to being tickled as "torture" although she laughed). In contrast, most people willingly seek to expose themselves to humorous stimuli, paying to attend comedy clubs and watch funny movies. If tickle produced the same positive internal state of mirth, they could just stay at home and tickle one another.

The present results are consistent with tickle and humour responses sharing a final common motor-response pathway, without sharing the same psychological state. In this account, humorous stimuli create the internal state of mirth, which then triggers a response of laughter, whereas appropriate tactile stimulation produces a special sensation of tickle (but no mirth), and this in turn directly activates a laughter response. The internal threshold for activation of the laughter response varies among individuals, and governs the amount of laughter in both settings.

This hypothesis is supported by our findings in several ways. First, if tickle and humour are related only by a shared threshold for laughter and smiling, then there should be a significant correlation of these behavioural displays and no correlation between self-report measures of humour and tickle. This was indeed what we found. If, on the other hand, tickle and humour were both variants of the same internal state (e.g. mirth) then self-report measures should have been at least as highly correlated as behavioural measures, which was not the case. The finding that humour and tickle do not enhance one another further supports this view that they do not share the same internal state.

The results fit well with some rarely cited observations of Leuba (1941), who carried out a pioneering study involving two of his own children, designed to test the hypothesis that elicitation of laughter by tickle results from its association with humour through Pavlovian conditioning. To prevent conditioning, he never knowingly permitted the children to be tickled in mirthful contexts, and all tickling took place with the tickler

wearing a mask to obscure any facial expressions. Leuba reports that the children exhibited normal ticklish laughter. Although this study has limitations, it suggests that laughter from tickling is not due to tickling having been paired with other humorous or pleasant stimuli.<sup>2</sup> Of course, this study, and our own results, do not rule out the possibility that humour develops ontogenetically from tickling (Fridlund, 1994), but after this development has taken place, the two may share only a final common pathway. The results also leave open the possibility that tickle shares an internal state with other emotions such as social anxiety and that ticklish laughter might be similar to nervous rather than mirthful laughter.

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<sup>2</sup> Other research (Hoshikawa, 1991; Newman, O'Grady, Ryan, & Hemmes, 1993), however, suggests that tickling can serve as an unconditioned stimulus. For example, just the sight of fingers making a tickling motion can produce laughter.