



Self-deception inhibits laughter

Robert F. Lynch*, Robert L. Trivers¹

Department of Anthropology, Rutgers University, 131 George Street, RAB 3rd Floor, New Brunswick, NJ 08901, USA

ARTICLE INFO

Article history:

Received 21 October 2011
Received in revised form 8 February 2012
Accepted 22 February 2012
Available online 9 May 2012

Keywords:

Facial action coding system
Self-deception
Laughter
Humor

ABSTRACT

How does self-deception affect the appreciation of humor and laughter? Fifty-nine undergraduates at Rutgers University (33 females, 26 males) were videotaped while watching a stand-up comedian for 28 min. Positive emotional expressions associated with laughter were analyzed for short sections of the act (total: 8 min or 14,400 video frames) and were scored for each subject using the facial action coding system (FACS). Participants who scored lower on a self-deception questionnaire (low self-deceivers) laughed significantly longer and more intensely than those who scored higher on the questionnaire (high self-deceivers). This was true when corrected for measures of impression management, extraversion, mood and how much a person laughs in their everyday life. If self-deception evolved to deceive others and laughter is a hard to fake signal of preferences, then suppressed laughter by self-deceptive individuals may serve to mask ones preferences. More generally since humor often involves seeing life or a person from a novel angle and self-deception tends to reduce such angles, self-deception will naturally tend to reduce ones sense of humor.

© 2012 Elsevier Ltd. All rights reserved.

1. Introduction

Incongruity theory has dominated scientific investigations of humor for decades (Attardo & Raskin, 1991). Darwin (1871) wrote of laughter, “Something incongruous or unaccountable, exciting surprise and some sense of superiority in the laugher seems to be the commonest cause. The circumstances must not be of a momentous nature.” Although a statement might fulfill the requirements of being both surprising and incongruous, it may not be funny if it ends with someone in a coma. In some cases the joke itself is the signal we use to alert others to the (supposed) inconsequential nature of intended humor. If someone is offended or doesn’t see the humor in a comment, we may explicitly tell them that, “It was just a joke.” ‘Getting the joke’, however, may require the recognition of an incongruity, which may in turn rely on access to unconscious information as well as an absence of cognitive bias. Clarke (2008) argues that humor is evoked by the surprise recognition of a novel pattern and rewards cognitive development. It evolved later as an external signal (laughter) which allows this ability to be advertised in an involuntary and honest manner. Although there have been a wide range of theories addressing the evolutionary function of laughter, many suggest an important role for the unconscious in humor appreciation.

Until recently, laughter had been regarded as a uniquely human behavior. Laughter-like behavior has now been reported in other species, including chimpanzees (Provine, 1996) and rats (Knutson, Burgdorf, & Panskepp, 2002). Chimpanzees utter laugh-like sounds when they are being chased and (as in children) it is those being chased that laugh. Research on wild chimpanzees provides evidence that play panting (laughter) functions as a signal to the chaser that the interaction is not perceived as threatening and that play can continue (Matsusaka, 2004). Others have imagined a link between laughter and discriminating between play and aggressive behavior in early hominids (Gervais & Wilson, 2005). Thus the ability to accurately perceive reality-by discriminating between threatening and harmless behavior may sometimes be important in stimulating laughter. In rats laughter was induced by tickling. It is not known if laughter in other species shares a common ancestry with laughter in humans.

Trivers defines self-deception as “the active misrepresentation of reality to the conscious mind” (Trivers, 2011). He argues that self-deception evolved, in an ongoing arms race between deception and its detection, the better to conceal deceit which may be unwittingly revealed through nervousness and signs of cognitive load by the deceiver (Trivers, 2011). Because self-deception interferes with one’s ability to accurately perceive reality, it may hinder one’s ability to recognize incongruities, thus reducing laughter. It has been shown that participants classified as higher in self-deception find it more difficult to identify anomalies (Peterson, Driver-Linn, & deYoung, 2002). Participants scoring in the top quartile of self-deception scores (using the self-deception denial scale of the BIDR) took twice as many trials to identify anomalous playing cards, such

* Corresponding author. Address: 750 Columbus Avenue, apt 11M, NYC, NY 10025, USA. Tel.: +1 917 449 9148; fax: +1 732 932 1564.

E-mail address: robertlynch66@yahoo.com (R.F. Lynch).

¹ Tel.: +1 732 948 8880.

as a black jack of diamonds (it should be red), compared with those scoring in the lowest quartile. Both groups identified the regular cards with equal speed and accuracy. Likewise a participant's inability to recall negative or threatening words is linked to high scores on the self-deception denial scale of the BIDR (Shane & Peterson, 2004). These results, in connection with the possibility that humor appreciation involves either the identification of anomalies (Darwin, 1871) or the ability to process a potential threat as harmless (Matsusaka, 2004) suggest that self-deception may interfere with an appreciation of certain types of humor.

If the adaptive benefit of self-deception is to conceal one's beliefs and preferences, and humor serves to reveal them, then self-deception may hinder one's ability to appreciate humor and may suppress the laughter signal. We therefore hypothesized that high self-deceivers would be less able to access contradictory 'true' beliefs and would laugh less than low self-deceivers in response to humorous material.

Another way to put the matter is that humor deals with the absurdities of life. The less you are in tune with reality the less likely you are to see the absurdities. Rational thought often involves viewing a person or situation from multiple angles, the better to get an unbiased overview. Humor also often involves seeing something from a novel angle, with surprising and pleasing effects. But if you are practicing self-deception and blocking out certain angles, you will, when these angles are exposed, fail to see the absurdity and fail to enjoy the humor. George Meyer, a lead writer for the Simpson's, says of comedy, "It's like seeing in two dimensions and then opening the other eye or looking through a View-Master and suddenly seeing in three" (Owen, 2000). If this argument is true, then less laughter may signal higher self-deception, a fact that may be worth noting by others.

2. Methods

The participants and comedy videos used in this study are the same as those used for a previous study which found evidence of a positive association between laughter and an individual's implicit preferences (Lynch, 2010). Fifty-nine undergraduates from diverse backgrounds (26 males, 33 females—36 Caucasians, 21 Asians, and 2 African-Americans) from an introductory anthropology course were selected for the study and offered extra credit (5% added to their final grade) in exchange for their participation. Each subject filled out the 20-question, self-deception denial subscale and the 10-question impression management subscale of the Balanced Inventory of Desirable Responding (BIDR) (Paulhus & Reid, 1991). The subject was videotaped watching a 30-min video of stand-up comedian Bill Burr, and answered a few questions about their mood, self-reported extraversion and enjoyment of the comedian. The order of the tasks was counterbalanced between watching the video and taking the self-deception and impression management questionnaires.

2.1. FACS

We used a facial action coding system (FACS) that provides an exact representation of facial expressions, avoiding the numerous problems of self-reports (Ekman & Friesen, 1978). There is a growing body of evidence that certain facial expressions, particularly AU6, also known as the 'Duchenne smile' (the squinting of the outer eyes), are extremely difficult to fake and rely on unconscious processes (Ekman, Davidson, & Friesen, 1990). This part of a smile signals genuine warmth. Participants' facial expressions were recorded applying the seventh version of the Emotion Facial Action Coding System (EMFACS-7) (Friesen & Ekman, 1984). Both FACS and EMFACS are comprehensive anatomically based techniques

for objectively measuring facial expressions. Each facial movement is assigned a code called an action unit (AU). While FACS records intensity, duration and type of action unit for all 44 discernible facial expressions, EMFACS allows a coder to record only those action units involved in emotions relevant to the study. The present study employed EMFACS and concentrated on 4 action units suggested by Ekman (personal communication) to be specifically involved in laughter.

AU's 6 and 7 (tightening of ring muscles around the eyes), AU 12 (raising of outer lip corners), and AU 14 (tightening of outer lip corners) have previously been identified as markers of positive emotion, are expressed during laughter and were the only action units scored for this study. These four AU's were scored for intensity, duration and type (AU number) for each individual frame (30 frames per second) for all coded sections of the videotape. As suggested by the EMFACS manual, only intensity levels 2–5 were used, as mistakes can easily be made when attempting to discern subtle facial movements associated with the low intensity level of 1.

The time consuming, frame by frame, analysis required by EMFACS did not allow for the facial expressions of participants to be coded for the entire length of the routine. So the scoring of participants watching the comedy routine was divided into three segments of 160 s each. Segments were selected for diversity of content—topics such as anorexia, why men should make more money than women for doing the same job, and the comedian's fear of African Americans. For each frame that was coded (total of 480 s or 14,400 frames), action units and intensity were recorded by Robert Lynch who is certified to use the facial action coding system and passed the FAC's final exam. All scores for all frames were summed for each action unit and participants were given a score that reflected the intensity and duration of each AU recorded. The total scores for all AU's were then combined into a composite score reflecting a participant's positive emotional expression for all three parts of the routine.

2.2. Self-deception questionnaire

The self-deceptive subscale of the Balanced Inventory of Desirable Responding (BIDR) was filled out by each participant (Paulhus & Reid, 1991). It is a 20-item questionnaire and closely resembles the original Self-Deception Questionnaire (SDQ) developed by Sackheim and Gur (1978). The measure confronts people with thoughts or beliefs that many individuals may be reluctant to admit having, and purports to capture the varying degree to which they are willing to acknowledge these thoughts (see [Supplementary material: Appendix A for the questions and the scoring system](#)).

Each participant responded to each question with a number on a scale of 1 'not at all true' to 7 'very true'. Some of the questions included are "More than once it felt good when I heard on the news that someone had been killed", and "I could never enjoy being cruel". Each extreme response (1 and 2 or 6 and 7, respectively) was scored as one point if it reflected a reluctance to admit to something distasteful. For example, a participant who responded with a 1–5 to the item "I can't think of anyone I hate deeply" would not receive any point while a 6 or 7 (very true) gave the participant one point. The more points a participant received (a maximum of 20) the higher in self-deception he or she was perceived to be.

Several experimental studies have demonstrated the value of the self-deception questionnaire used here. Subjects scoring higher on this questionnaire have shown more illusion of control, believe they are safer drivers, show increased susceptibility to falling in love (Paulhus & Reid, 1991), higher implicit religiosity (Leak & Fish, 1989), extreme confidence in memory and increased hindsight bias. They have also claimed more familiarity with nonexistent products and report higher self-esteem (Paulhus & Reid, 1991).

After a failure, subjects scoring high on the questionnaire are also more likely to show a self-serving bias (Paulhus, 1988).

2.3. Impression management scale

The impression management subscale of the Balanced Inventory of Desirable Responding (BIDR) was also filled out by each participant (Paulhus & Reid, 1991). It is a 10-item questionnaire with questions answered as True or False and is intended to measure deception of others. It is often used in combination with the self-deception questionnaire to distinguish between self-deception and deception of others. Typical questions are 'I always tell the truth' and 'I have taken sick leave from school or work when I wasn't really sick' (see [Supplementary material: Appendix B for questions and scoring](#)). The questions are supposed to measure lying to others in an attempt to improve one's social desirability and are questions that an individual is expected to accurately remember. The impression management subscale is more susceptible to purposeful manipulation than the SDQ. Retest correlations over a 5 week period for both the SDQ and impression management scales were .69 and .65, respectively (Paulhus, 1988).

2.4. Comedy routine

Each participant was seated alone in a room and videotaped while watching the comedian Bill Burr's half hour HBO "One Night Stand" which was publicly available on his website (<http://www.billburr.com/audioVideo.shtml>; see online [Supplementary material videos 1–3 for coded segments of the routine](#)). After being seated in front of the screen participants were given no further directions except to watch the routine and let Mr. Lynch know when it was over.

2.5. Self reports

Participants were also asked the following questions: How funny did you find the comedian? (1 not at all funny to 5 very funny), rate your mood today (1 very poor to 5 very good) and a 5 point Likert scale (1 = strongly agree to 5 = strongly disagree) was used to assess agreement with the statements 'I consider myself to be an extravert' and 'I laugh a lot in my everyday life'.

3. Results

Total positive affect over all three coded segments of the routine, as coded by the facial action coding system (Action Unit 6, AU 7, AU 12 and AU 14 combined), correlated significantly and negatively with participants' scores on the self-deception questionnaire ($r = -.40, N = 59, p < .01$) (see [fig. 1](#)). This association was strengthened slightly when only the involuntary, and presumably hardest to fake, eye corner wrinkler (AU6) involved in a genuine 'Duchenne' smile was used ($r = -.41, N = 59, p < .01$). An OLS regression of FACS on self-deception, however, violated the assumption of homogeneity of variance. In short, there was more variance in laughter among less self-deceptive individuals than among high self-deceptive participants (White's statistic = 4.65 > 3.84 (Chi square ($p < .05$)) with 1 degree of freedom). This was likely due to a floor effect as negative emotions such as disgust were not scored and no subject could score below 0 on FACS. Using weighted least squares (WLS) analysis to overcome this violation resulted in a significant negative correlation between laughter and self-deception ($r = -.47, N = 59, p < .01$). The Likert scale that was used to assess an individual's self-reported appreciation of the humor was also strongly correlated with total positive affect as measured by FACS ($r = .52, p < .01$) and was also

correlated negatively with our measure of self-deception ($r = -.33, p < .05$).

There was a significant positive correlation between the impression management subscale and the SDQ ($r = .36, p < .01$), as expected. A partial correlation of the SDQ and FACS, controlling for impression management (lying to others), confirms a slightly reduced but still highly significant relationship between FACS measured laughter and the SDQ ($r = -.39, p < .01$). Self-reported degree of extraversion was not significantly correlated with the SDQ ($r = -.17, p = .217$) and the mood of the participant was not correlated with FACS measured laughter ($r = .11, p = .41$). A partial correlation between the SDQ and FACS controlling for self-reported degree of extraversion reveals a still significant relationship between the SDQ and FACS ($r = -.38, p < .01$). Even when controlling for mood, impression management, extraversion and how much a participant laughs in his or her everyday life, this relationship remains significant ($r = -.32, p < .05$). Participants who reported that they laughed more in their everyday life did have higher FACS scores ($r = .29, p < .05$), but they did not report greater appreciation of the comedy ($r = .12, p = .369$). (See [Table 1](#) for correlations between all variables used in this study.)

4. Discussion

Participants who scored higher on a self-deception questionnaire laughed less and reported less enjoyment in response to a stand-up comedian than those who scored lower. This study directly measures facial expressions associated with laughter. By including the presumably involuntary Duchenne smile (AU6) as a response variable, and removing any social aspect (participants were alone in a room) we limited both the ability and motivation for participants to deliberately manipulate the laughter signal. It is therefore likely that participants' facial expressions and self-reported enjoyment of the comedian were an honest reflection of their appreciation of the humor. They both laughed more and reported that they enjoyed it more because they thought it was funny. We therefore believe that we accurately measured both humor appreciation and laughter. These results support the hypothesis that self-deception inhibits one's sense of humor, including its expression.

Larry Wilde, author of 'Great Comedians Talk about Comedy', writes that the key characteristic that all the comedians he interviewed had in common was 'extraordinary self-awareness' (Wilde, 2000). Because self-deception impairs self-awareness, it may also interfere with one's sense of humor. Unconscious or semi-conscious biases have also been shown to augment the laughter response. A previous analysis of the same individuals used in this study showed that the amount of laughter increases in response to jokes which match an individual's unconscious preferences. These preferences are measured by an implicit association test (e.g. individuals who prefer whites to blacks laugh more at racially charged material) (Lynch, 2010).

These two findings in common suggest an association between humor and what we think is true. Some researchers have suggested that laughter evolved first as an honest signal, which was later subject to manipulation and deceit by non-Duchenne smiling and laughter (Owren & Bachorowski, 2001). If laughter functions, in part, to reveal true beliefs and preferences and self-deception serves to mask them, it is then not surprising that the laughter signal will be suppressed by self-deception. Other emotions, however, are also involuntary and laughter is not unique in this respect. Our results, therefore, do not prove that laughter functions as an honest signal and are equally consistent with the possibility that self-deceivers are simply less able to identify errors and therefore see fewer potentially humorous situations.

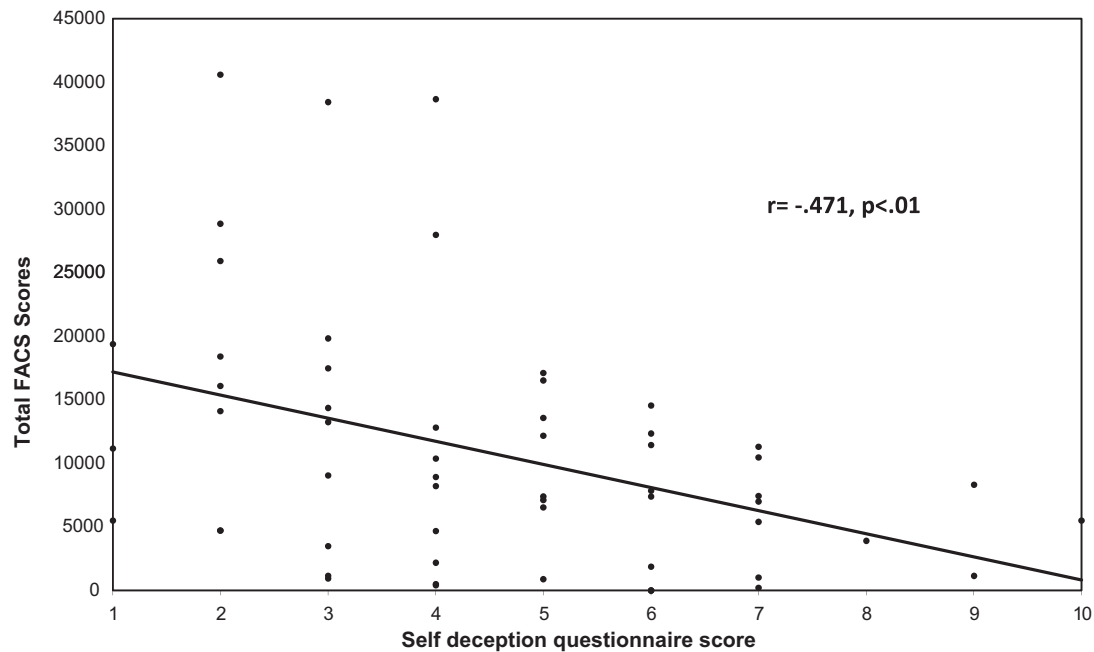


Fig. 1. The raw data for all self-deception questionnaire scores (reported r is corrected for heteroskedasticity) plotted against facial expressions for all coded sections of the comedy routine. Low SDQ score indicates low self-deception score.

Table 1
Correlation matrix of key variables used in study.

		1	2	3	4	5	6
1	Self reported enjoyment of comedian (low to high)	Pearson correlation Sig. (2-tailed) N					
2	Self-reported assessment of mood (low to high)	Pearson correlation Sig. (2-tailed) N	.38**				
3	Self-reported laughter in everyday life (low to high)	Pearson correlation Sig. (2-tailed) N	.12	.34**			
4	Impression management score (low to high)	Pearson correlation Sig. (2-tailed) N	-.14	.07	.13		
5	Self deception score (low to high)	Pearson correlation Sig. (2-tailed) N	-.33	-.07	-.20	.36**	
6	Self-reported extraversion (low to high)	Pearson correlation Sig. (2-tailed) N	.25	.27	.46**	.14	.17
7	FACS score	Pearson correlation Sig. (2-tailed) N	.52**	.11	.29*	-.09	-.40**
			.07	.05	<.01	.29	.22
			.54	.54	.54	.54	.54
			.58	.58	.58	.58	.55

* Significance at $p < 0.05$ level.

** Significant at $p < .01$ level.

Some individuals are more emotionally expressive than others and this alone could explain our results. If people who score low on self-deception are more emotionally expressive than those who score high and therefore laugh more in general, the connection between self-deception and laughter reported here could be spurious. The lack of any connection between self-reported extraversion or a subject's mood and FACS measured laughter, however, suggests that this is unlikely to be the case. While asking subjects to report on their own extraversion (instead of having them fill out an extraversion questionnaire) is not the best measure of emotional expressivity, the correlation between an individual's reported enjoyment of the humor and their actual laughter (FACS)

suggests that an individual's emotional expressions did correspond to his or her enjoyment of the material. Indeed, the correlation between self-reported enjoyment of the comedian and FACS scores suggests that we accurately measured both the internal state (humor appreciation) and the signal (laughter). Both of these measures are significantly and negatively correlated with scores on the self-deception questionnaire. Although the results of this study are not seriously influenced by switching between the measures of self-reported humor appreciation and FACS measured laughter, we prefer the results connecting FACS scores and the SDQ since this is an objective measure of behavior and includes, difficult to fake, Duchenne laughter (Owren & Bachorowski, 2001). Even when

controlling for impression management, in an effort to distinguish between self-deception and deception of others, the major correlations remain significant.

To our knowledge this is the first study to provide direct empirical evidence connecting self-deception with laughter. More self-deception is associated with less laughter. These results are consistent with an important role of the unconscious in humor appreciation. Self-deceptive individuals may be less able to resolve anomalies which may impair their sense of humor. Suppression of the laughter signal in self-deceptive individuals may also function to hide ones true beliefs from others.

Acknowledgements

We thank Alistair Clarke for reading and commenting on several drafts and Paul Ekman for suggestions on using EMFACS and on which facial expressions to code.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.paid.2012.02.017.

References

- Attardo, S., & Raskin, V. (1991). Script Theory revis(it)ed: Joke similarity and joke representation model. *Humor: The International Journal of Humor Research*, 4, 293–347.
- Clarke, A. (2008). *The pattern recognition theory of humour*. Pyrrhic House.
- Darwin, C. (Ed.). (1871/1998). *The expression of emotions in man and animals*. (John Murray ed.): University of Chicago Press.
- Ekman, P., Davidson, R., & Friesen, W. (1990). The Duchenne smile: Emotional expression and brain physiology II. *Journal of Personality and Social Psychology*, 58, 342–353.
- Ekman, P., & Friesen, W. V. (1978). *Facial action coding system (FACS): Manual*. Palo Alto: Consulting Psychologists Press.
- Friesen, W. V., & Ekman, P. (1984). *EMFACS-7 emotion facial action coding system*. Unpublished manuscript.
- Gervais, M., & Wilson, D. S. (2005). The evolution and functions of laughter and humor: A synthetic approach. *Quarterly Review of Biology*, 80(4), 395–430.
- Knutson, B., Burgdorf, J., & Panskepp, J. (2002). Ultrasonic vocalizations as indices of affective states in rat. *Psychological Bulletin*, 128, 961–977.
- Leak, G. K., & Fish, S. (1989). Religious orientation, impression management and self-deception: Toward a clarification of the link between religiosity and social desirability. *Journal for Scientific Study of Religion*, 28, 355–359.
- Lynch, R. (2010). It's funny because we think it's true: Laughter is augmented by implicit preferences. *Evolution and Human Behavior*, 31(2), 141–148.
- Matsusaka, T. (2004). When does play panting occur during social play in wild chimpanzees? *Primates*, 45, 221–229.
- Owen, D. (March 13, 2000). Taking humor seriously—George Meyer, the funniest man behind the funniest show on TV. *The New Yorker*, 13–37.
- Owren, M. J., & Bachorowski, J. A. (2001). Smiling, laughter, and cooperative relationships: An attempt to account for human expressions of positive emotions based on “selfish gene” evolution. In T. Mayne & A. Bonanno (Eds.), *Emotion: Current issues and future development* (pp. 152–191). NY: Guilford.
- Paulhus, D.L. (1988). *Assessing self-deception and impression management in self reports: The Balanced Inventory of Desirable Responding*. Unpublished Manual, University of British Columbia, Vancouver, Canada.
- Paulhus, D. L., & Reid, D. B. (1991). Enhancement and denial in socially desirable responding. *Journal of Personality and Social Psychology*, 60, 307–317.
- Peterson, J. B., Driver-Linn, E., & deYoung, C. G. (2002). Self-deception and impaired categorization of anomaly. *Personality and Individual Differences*, 33, 327–340.
- Provine, R. R. (1996). Laughter. *American Scientist*, 84, 38–45.
- Sackheim, H. A., & Gur, R. C. (1978). Self-deception, self-confrontation and consciousness. *Consciousness and Self-regulation: Advances in Research*, 2, 139–197.
- Shane, M. S., & Peterson, J. B. I (2004). Self-induced memory distortions and the allocation of processing resources at encoding and retrieval. *Cognition and Emotion*, 18(4), 533–558.
- Trivers, R. L. (2011). *Folly of Fools: The logic of deceit and self-deception in human life*. New York, NY: Basic Books.
- Wilde, L. (2000). *Great comedians talk about comedy*. Mechanicsburg, PA: Executive Books.

Web Reference

- Burr. (2006). *HBO website*. <<http://www.billburr.com/audioVideo.shtml>>.