Influence of Gender on Judgment of
Dark and Nondark Humor

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ABSTRACT - We examined gender differences in the perception of dark and nondark humor. Judgment ratings based on four humor characteristics (Surprise, Incongruity, Comprehension and Funniness) were assessed. Results revealed significant differences in the perception of dark and nondark humorous cartoons for women only. Women rated nondark cartoons as less incongruous and less surprising but more comprehensible and funny than dark ones. Furthermore, for men ($n =$ 150) and women ($n = 150$), Surprise and Comprehension ratings were both significant predictors of the funniness of nondark cartoons. However, Funniness predictors of dark cartoons were modulated by gender. These results reflect general inter-individual differences on the appreciation of specific forms of humor and extend Suls's cognitive model (1972) of humor.

Inter-individual variability observed in humor-related behavior and experience may provide support for the multidimensionality of humor. Perhaps the most discriminating inter-individual variability is the case of gender. The study of gender differences in the area of psychology has been extensive. A meta-analysis of this research by Hyde (2005, 2007) concluded that men score higher in visual-spatial activity, aggressiveness (Burton, Hafetz, & Henninger, 2007) and in mathematic abilities (Hedges & Nowell, 1995) than women. Conversely, women score higher than men, in communication (LaFrance, Hecht, & Paluck, 2003), verbal abilities, moral reasoning (Jaffee & Hyde, 2000) and emotion (Brody & Hall, 2000). Gender differences have also been observed as far as humor-related phenomenona are concerned. Indeed, there is a great amount of evidence for gender differences in the perception, production and utilization of humor (see Lampert & Ervin-Tripp, 1998). For example, women appear to prefer nonsense humor, whereas men are likely to enjoy aggressive and sexual humor. This study explores gender differences in the perception and appreciation of a specific form of humor, namely dark humor, which surprisingly has received little, if any, attention in this research area.

Humor-related topics can be defined as "anything that people say or do that is perceived as funny and tends to make others laugh" (Martin, 2007, p.5). Most cognitive humor theories assume that humor relies on the simultaneous perception of a situation (event, idea) from the perspective of two self-consistent but normally incompatible frames of reference, namely incongruity (Samson, Hempelmann, Huber, & Zysset, 2009). According to Suls (1972), a situation becomes humorous and as such associated with the

experience of a positive emotion (i.e., exhilaration, mirth, laugh, pleasure) through a two-stage process. This process involves first the identification of an incongruity and then its subsequent resolution in order for a situation to be respectively understood and appreciated as humorous. In particular, situations, events, or objects are incongruous when their presence triggers a discrepancy with the situation model constructed by the recipient (van Dijk & Kintsch, 1983; Zwaan, Langston, & Graesser, 1995).

When a reader looks at a cartoon, initial information activates stored expectations to construct a mental model. Further information provided by the perception of a specific element leads to the construction of a subsequent mental model. The experience of the incongruity is the result of the comparison between the first and the second model. In order to appreciate the cartoon, the recipient has to resolve the incongruity. Therefore, he/she is forced to go backwards and reinterpret the image or to fit his/her situational model to the image. Coulson and Kutas (2001) called this kind of conceptual revision *frame-shifting*.

However, given the fact that many different forms of humorous situations exist (e.g., non-sense, sexual, aggressive, teasing, dark) it has been questioned whether besides incongruity resolution other additional variables may contribute to this process. Such variables include structural characteristics such as the nature and extent of incongruity, the surprise triggered by the perception of an incongruity and the overall comprehension of a situation as humorous (Herzog, Harris, Kropscott, & Fuller, 2006). Furthermore, inter-individual differences such as gender, personality traits and sense of humor have also been shown to modulate the extent to which various humorous forms are perceived and utilized (Ruch, 1992, 2007).

A specific form of humor with interesting characteristics is dark humor. Dark humor relies on the deviation from values and the transgression of social norms and moral systems and as such relates closely to both sick and aggressive/hostile humor. On one hand, sick humor is content-defined and includes topics such as disease, deformity, death and handicap (Mindess, Miller, Turek, Bender, & Corbin, 1985). On the other hand, aggressive or hostile humor is function-defined used as a form of criticism and expressed when socially inappropriate (Martin, 2007). Both of these types of humor can be perceived as antisocial and transgressive (Saroglou & Anciaux, 2004). Because dark humor concerns a broad negative content and can indeed serve negative interpersonal purposes (Dolitsky, 1983) it appears to provoke mixed valenced emotions such as amusement and shame or disgust (Aillaud & Piolat, 2011). Overall, dark differs from nondark humor in the nature of incongruity involved (i.e., social norm transgression) and consequently the extent of surprise experienced as well as the level of comprehension of a situation as humorous. As such the study of dark humor in relation to gender differences allows us to explore the interaction of several structural characteristics and inter-individual variability in the perception and appreciation of humorous situations.

Indeed, past research has provided evidence for gender differences in the appreciation of specific forms of humor. Thorne, Kramarae, and Henley (1983) reported that obscene or sexual humor is normatively restricted to men. Other studies reported that compared to women men prefer both sexual and/or aggressive humor (Brodzinsky, Barnet, & Aiello, 1981; Crawford, 1989; Herzog & Hager, 1995). Furthermore, a handful of studies have indicated that men tend to like sick humor more than women do (Herzog

& Anderson, 2000; Herzog & Karafa, 1998; Oppliger & Zillmann, 1997). Finally, the relationship between joke cruelty and appreciation has been found to be moderated by gender (Herzog & Anderson, 2000; Herzog et al., 2006, Samson & Meyer, 2010) and jokes categories (Herzog & Bush, 1994; Herzog & Karafa, 1998). Specifically, Herzog and colleagues' research demonstrated a negative linear relation between cruelty level of joke and appreciation for women only. These results postulated gender differences in a large scope of emotion, sensitivity to violence, role of biological and hormonal factors in affective reactions as well as a cultural impact in the perception of specific negative humorous forms such as aggressive, sick, gallows or dark.

Furthermore, inter-individual variability effects have been demonstrated in humor utilization. In terms of gender differences, men have been reported to create and produce more humorous items (teasing, kidding, joking) than women (Lampert & Ervin-Tripp, 1998; Lundy, Tan, & Cunningham, 1998; Provine, 2000) with the former specializing in, hostile humor (Crawford & Gressley, 1991) and the latter in producing more anecdotes, spontaneous stories and context-related humor (Hay, 2000; Kotthoff, 2006). Further, Jenkins (1985) showed that women strengthen their social cohesion through interaction by using a cooperative, supportive, and self-mocking style of humor. In contrast, men are more involved in creating and maintaining a positive self-image and thus use more exclusive, challenging, and self-aggrandizing humor. Consequently, gender differences in humor utilization may influence perception of different humorous style, such as dark one.

The aim of the present study was first, to examine gender differences in the perception of dark compared to nondark humor on four humor characteristics, namely surprise, incongruity, comprehension and funniness by using a set of cartoons. The second objective was to explore any differences between men and women in the appreciation of different forms of humor by examining which of these characteristics contributed to whether cartoons were perceived as funny or not. The level of surprise has been shown to correlate with the degree of incongruity of humorous situations (Suls, 1972) and was found to be a positive linear predictor of humor appreciation (Herzog & Bush, 1994; Herzog & Hager, 1995; Herzog & Karafa, 1998; Wicker, Thorelli, Barron & Ponder, 1981). Furthermore, comprehension, which refers to the extent to which cartoons are understood as humorous items, has been found to be a curvilinear predictor of humor appreciation (Herzog & Bush, 1994; Herzog & Larwin, 1988). We expected to observe significant gender differences on the incongruity and surprise ratings in relation to the nature of humor (dark and non-dark). According to gender studies, women compared to men seem to be more affectionate (Briton & Hall, 1995) and experienced with higher arousal feelings such as joy and sadness. Furthermore, Kohn, Kellermann, Gur, Schneider, and Habel (2011) showed that the neural substrates involved in humor processing are different between men and women. While the brain zones activated in cognitive processing of humor are similar for both genders, the brain areas involved in affective components are markedly different. As dark humor is concerned with the transgression of social norms and consequently elicits higher level of surprise than nondark humor, these gender differences should become apparent with female participants rating dark humor cartoons as more incongruous and more surprising than nondark ones. Similarly, as highlighted above gender differences have been found in the appreciation of specific styles of humor with males showing preference to sick and/or

aggressive humor, we expected that female participants would rate dark humor cartoons as being less funny than nondark humor ones.

Method

Participants

Participants were 300 psychology undergraduates (150 men, 150 women) from Aix-Marseille University, France. The average age of the sample was 20.6 years (*SD* = 2.96). They were all volunteers who received course credit as a reward.

Stimulus Materials

To control for graphic effects, 61 dark-and-white uncaptioned cartoons by Serre based on the notions of pleasantness/unpleasantness and physical/intellectual states were used. Serre (1938-1998) was an illustrator for a famous French magazine, before becoming a well-known drawer. His first book won a Dark humor award in 1972.

These cartoon stimuli were selected after a pretest with a separate sample of 15 male and 15 female undergraduates. These judges rated the initial set of cartoons by selecting anchors on a 5-point Likert type scale: "*not at all humorous*", "*no dark humor at all*", "*a little bit dark*", "*dark humor*", and "*very dark humor*". No definition of dark humor was given to participants for the pretest. Eighteen cartoons with the highest scores in the "*no dark humor at all*" category were selected for the nondark humor condition. Similarly, 18 cartoons with the highest scores in the "*very dark humor*" category were selected for the dark humor condition. All other cartoons stimuli were excluded from the experiment. The nature of the humor (dark vs. nondark) was administered in a counterbalanced order across sessions.

Apparatus

The present study followed the structure of Web-based experiments. These allow for randomization, the dynamic creation and display of questionnaires, and the automatic recording of responses. Cascading Style Sheets (CSS) were used to manage the site's presentation and the dynamic interactions with participants (for participants' judgments and the presentation of the humorous cartoons) were scheduled with JavaScript. The management of the dynamic pages (randomized presentation of slides for each participant, retrieval and recording of responses) was programmed in Hypertext Preprocessor (PHP), a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML. Besides managing the experiment, the software ("Humor-one") provided a counterbalanced sequence presentation. The four dimensions (surprise, incongruity, comprehension and funniness) were randomly presented.

Cartoon Judge Measure. To assess the differences between dark and nondark humor, we asked participants to rate each cartoon on four variables. To control for the meaning of participants' ratings, each dimension was defined as follows:

- Surprise: extent to which the situation depicted in this cartoon is surprising;
- Comprehension: extent to which the situation depicted in this cartoon can easily be identified as a humorous one;

- Incongruity: extent to which the situation depicted in this cartoon is unbecoming or unseemly;
- Funniness: extent to which the situation depicted in this cartoon is funny.

Procedure

Participants were seated 70 cm in front of a personal computer and were randomly assigned to the dark or the nondark humor condition. Upon arrival, information about the course of the experiment appeared on the computer screen. In the first part, each participant viewed one of the two subsets of 18 slides, displayed in a random order on a 600x 800 pixel computer screen. Each image remained on the screen for 6 s. Beforehand, the participant had been given the following instructions: "*You will be shown a sample of cartoons. You just have to look carefully at each one.*"

Immediately after viewing all the humorous cartoons in the sample, each cartoon was presented again one by one and participants were instructed to "*rate each cartoon as honestly as you can on four dimensions*" (Surprise, Incongruous, Comprehension and Funniness). The response format for each dimension was a 4-point scale anchored by clicking with the left mouse button on "*definitely not", "not", "slightly yes", and "definitely yes".* These anchors were assigned numerical values of 1-4, respectively, for scoring.

Results

### *Gender Differences on Humor Judgment*

For each participant, ratings on each of the four judgment dimensions were aggregated across cartoons. To test the differences between women and men's ratings, we explored each judgment dimension (Surprise, Incongruity, Comprehension and Funniness) separately. A 2 (Gender) × 2 (Humor type) ANOVA was made for each rating.

Results revealed that regardless of gender, there was a significant main effect of Humor type on Surprise ratings, $F(1, 296) = 11.13$, $MSE = 3.15$, $p < .001$, $\eta^2_p = 3.6\%$. This reflected the fact that dark humor cartoons were rated as more surprising ($M = 2.37$; $SD = 0.54$) than nondark ones ($M = 2.17$; $SD = 0.65$). Results concerning surprise ratings also indicated that Gender effect was not significant, $F(1, 296) = 0.24$, *ns*. Moreover, interaction between Humor type and Gender was no significant, $F(1, 296) = 0.40$, *ns.* For Incongruity ratings, results showed a main effect of Humor type $F(1, 296) = 21.30$, $MSE = 9.13$, $p < .0001$, $\eta^2_p = 6.71\%$. Dark humor cartoons ($M = 1.98$; $SD = 0.68$) were judged by both men and women to be more incongruous than nondark ones ($M = 1.63$; $SD = 0.65$). There was no significant effect of Gender on Incongruity ratings, $F(1, 296) = 0.55$, *ns*. However, the Humor type × Gender interaction was significant, $F(1, 296) = 9.04$, $MSE = 3.87$, $p = .0028$, $\eta^2_p = 2.96\%$, indicating that only women judged the dark humor cartoons to be more incongruous than the nondark ones. This result was confirmed by Tukey's (HSD) post-hoc test for women nondark vs. women dark humor, $p < .0001$.

ANOVA's results on the Comprehension rating showed a main effect of Humor type, $F(1, 296) = 12.92$, $MSE = 3.29$, $p < .001$, $\eta^2_p = 4.18\%$, with higher scores for nondark humor cartoons ($M = 3.06$, $SD = 0.49$) than for dark ones ($M = 2.85$; $SD = 0.53$). Gender effect was not significant, $F(1, 296) = 0.93$, *ns*. There was a significant Humor type ×

Gender interaction, $F(1, 296) = 4.10$, $MSE = 1.04$, $p = .0439$, $\eta^2_p = 1.36\%$. This interaction reflected the fact that the women judged the nondark humor cartoons to be more comprehensible than the dark humor ones. This result was confirmed by Tukey's (HSD) post-hoc test for women nondark vs. women dark humor, $p < .0001$. For funniness ratings, ANOVA's results revealed a main effect of Humor type, $F(1, 296) = 17.13$, $MSE = 4.72$, $p < .0001$, $\eta^2_p = 5.47\%$, with higher scores for nondark humor cartoons than for dark humor ones. Gender effect was not significant on Funniness ratings, $F(1, 296) = 1.03$, *ns*. There was also a significant interaction between Humor type and Gender, $F(1, 296) = 14.19$, $MSE = 3.91$, $p < .0001$, $\eta^2_p = 4.57\%$. Women judged nondark humor cartoons ($M = 2.45$; $SD = 0.49$) to be funnier than dark ones ($M = 1.97$; $SD = 0.55$; $p < .001$, Cohen's $d = 0.92$). Thus, these results provided some evidence that only women judged nondark humor cartoons to be different from dark humor ones, at least regarding these four dimension of humor judgment (Figure 1).

Figure 1

Means of Four Ratings (surprise, incongruity, comprehension and funniness) for the Two Humor Conditions (dark vs. nondark) and for Men and Women
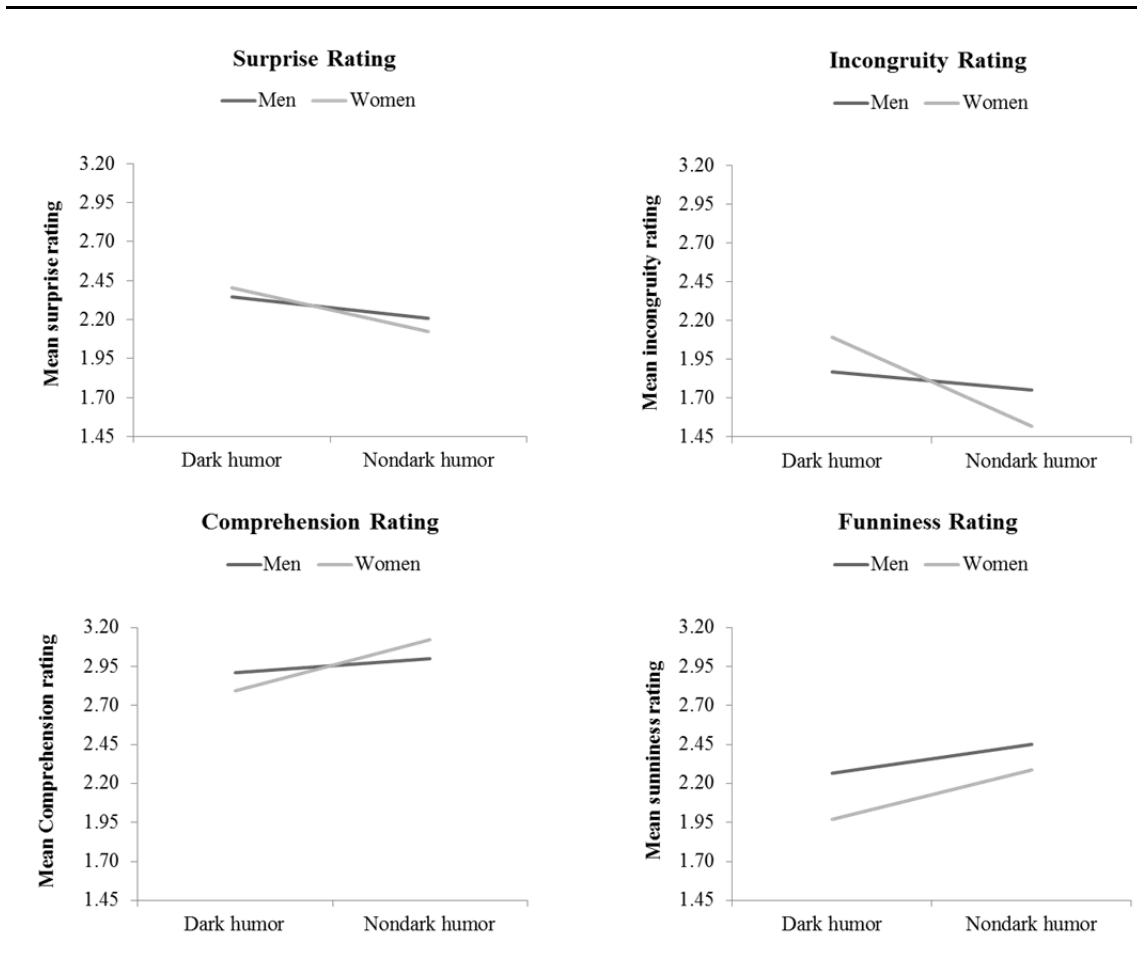
Gender Differences on Funniness Rating

Since gender differences was a key variable in our study, it was crucial to examine for both women and men if funniness could be explained by the same predictors (Surprise, Incongruity, Comprehension) as regard to Humor type. To do so, we conducted a hierarchical regression analysis by comparing a first additive model (M1) where only main effects (Gender, Surprise, Comprehension and Incongruity) were entered with a second multiplicative model (M2) where only the following second-order interactions were added (Gender × Surprise, Gender × Comprehension and Gender × Incongruity).

Hierarchical Regression Results for Nondark Cartoons

Additive Model (M1). First, we conducted an additive model, with Funniness rating as dependent variable and Gender, Surprise, Comprehension and Incongruity as predictors.

Results showed that the significant predictors for Funniness ratings were Comprehension ($\beta = 0.24$, $F = 3.3$, $p < .01$) and Surprise ($\beta = 0.46$, $F = 6.4$, $p < .001$).

Multiplicative Model (M2). This model was aimed to examine to what extent Gender significantly interacts with the four predictors, therefore the following interactions terms (Gender × Surprise, Gender × Comprehension and Gender × Incongruity) were added to the model.

Results showed that the only significant predictors was Surprise ($\beta = 0.40$, $F = 3.88$, $p < .001$).

Models Comparison. The comparison of both R-squared values did not show a significant difference between the two models ($AIC_{M1} = 190.02$, $R^2 = 31.9\%$ vs. $AIC_{M2} = 193.98$, $R^2 = 32.8\%$, $p = .58$, *ns*). Thus, for nondark humor cartoons the interaction between Gender and the three predictors was not relevant to explain the Funniness ratings.

Hierarchical Regression Results for Dark Cartoons

Additive Model (M1). Likewise, we conducted an additive model for dark humor cartoons. Results indicated that the significant predictors of Funniness ratings were Gender ($\beta = 0.22$, $F = 2.94$, $p < .01$), Incongruity ($\beta = 0.19$, $F = -3.07$, $p < .01$), Surprising ($\beta = 0.33$, $F = 4.26$, $p < .001$) and Comprehension ($\beta = 0.41$, $F = 5.81$, $p < .001$).

Multiplicative Model (M2). This model was aimed to examined to what extent Gender significantly interacts with the four predictors, therefore the following interactions terms (Gender × Surprise, Gender × Comprehension and Gender × Incongruity) were added to the model.

Results showed that the significant predictors were Incongruity ($\beta = 0.35$, $F = -4.11$, $p < .001$), and Comprehension ($\beta = 0.53$, $F = 5.77$, $p < .001$). Moreover, interaction between Gender and Incongruity was significant ($\beta = 0.34$, $F = 2.91$, $p < .01$). Interaction between Gender and Surprise was also significant ($\beta = 0.29$, $F = 1.99$, $p < .05$).

Models Comparison. The comparison of both R-squared values showed a significant difference between the two models ($AIC_{M1} = 191$, $R^2 = 17.8\%$ vs. $AIC_{M2} = 172.36$, $R^2 = 15.4\%$, $p < .001$). Thus, for dark humor cartoons the interaction between Gender and the three predictors was relevant to explain funniness ratings. In order to examine the proportion of the criterion variance associated with the predictor a semipartial correlation

coefficient was calculated. Results indicated that multiplicative model explain almost 32% ($r = 0.32$) more variance than additive model. Thus, for dark humor cartoons it is relevant to take into account Gender factor to determine funniness predictor.

Intercorrelations Results

In order to properly interpret the regression, intercorrelations among the four ratings were conducted, in men and women separately. Because, the intercorrelations between Gender and predictor factors of Funniness rating were significant only for dark humor, we decided to report only the intercorrelations for dark humorous material.

Results, indicated that for men, Funniness ratings were positively correlated with Comprehension rating ($r = 0.307$, $p < .01$) and Surprising rating ($r = 0.483$, $p < .01$). Whereas for women, the Funniness rating for dark humor cartoons was positively correlated with the Comprehension rating ($r = 0.529$, $p < .01$) and negatively correlated with the Incongruity rating ($r = - 0.362$, $p < .01$).

Discussion

In the present study, we investigated whether gender influences the perception of dark and nondark humorous cartoons on the following humor characteristics, Surprise, Incongruity, Comprehension and Funniness. Further, we examined which of these variables predicted the extent of funniness perception in relation to gender differences across both humorous conditions.

Results revealed an effect of gender on all humorous characteristics except of the rating of surprise. Contrary to our prediction, surprise was found to be influenced only by the nature of the cartoons, with dark humor cartoons being perceived as more surprising than nondark ones. Women, compared to men, have been shown to be more influenced by cruelty and social norms transgression (Herzog et al., 2006) due to their more affectionate nature and higher arousal feelings (Briton & Hall, 1995). Nevertheless, the results of the present study do not provide evidence for gender differences on the experience of surprise triggered by the perception of humorous incongruity.

However, gender differences were found. Indeed, the nature of humor cartoons modulated the Incongruity, Comprehension and Funniness ratings only for women and not for men. Women rated dark humor cartoons as being more incongruous, less comprehensible and less funny than men did. Hence, women appear to be more sensitive to the transgression of social norms that subtends dark humor cartoons. These gender differences may reflect the more general way in which gender is expressed in social interactions (Crawford, 2003). According to Crawford (2003), "*gender* [refers] *to a system of meanings that operates at individual, interactional and social structural levels*" (p.1416). These findings are consistent with a gender-based social categorization. Our participants' gender-appropriate behavior reflected the fact that men perceive cartoons and other "aggressive" humorous situations to be funnier than women do (Jorgensen, Quist, Steck, Terry, & Taylor, 2008). Because women are expected to be kind, friendly, and tenderhearted, they are likely to react to specific forms of humor, such as dark humor, in a different way from men. In fact, Barrick, Hutchinson, and Deckers (1990) have shown that women were influenced by the amount of pain suffered by the character targeted in a humorous situation and thus perceived aggressive humor as less funny then

men who did not show this response pattern. Moreover, our findings raise questions about effective gender differences with regard to the social-structural theory. Do men and women truly perceive humorous cartoons in a different way or do they simply behave in accordance to culture beliefs and roles? The fact that our results indicated significant interactions between Gender and Humor type on specific humor characteristics appears to indicate that gender differences in behavior are stressed by social structures (Hyde, 2007). Nevertheless, gender differences are not only explained by social structure. According to Kret and de Gelder (2012) the difference between men and women may be due to biological elements such as genetics factors, hormones or cerebral networks.

Gender was also shown to influence which of the humor characteristics tested in our study predicted the extent of funniness of the cartoons. Consistent with Herzog et al.'s (2006) results for nondark humor cartoons Comprehension and Surprise ratings were significant predictors of funniness across men and women. However, gender was found to mediate the funniness predictors in the case of dark humor cartoons. For men, cartoons were perceived as funny if they were highly comprehensible and surprising, irrespectively of the nature of humor. Conversely, for women dark humor cartoons were perceived as funny only if they were highly comprehensible and with low level of incongruity, indicating that the humorous potential of dark humor decreased if the incongruity deviated from the social, moral or ethical norms. These findings appear to in line with Goel and Dolan (2007), who have argued that the social appropriateness of a situation is a strong one predictor of humor appreciation even though they failed to demonstrate any gender differences.

In conclusion, our findings provide an extension to Sul's cognitive model (1972). We clearly show that the humorous potential of a situation is not only dependent on the incongruity-resolution process but also on the very nature of such incongruity as well as the gender of the recipient. The gender differences observed in dark humor perception –at least as measured in the current study - confirm the impact of inter-individual variability on the appreciation of specific forms of humor (Galloway, 2010; Lourey & McLachlan, 2003; Martin, Pullik-Doris, Larsen, Gray, & Weir, 2003; Ruch & Carrell, 1998; Samson & Gross, 2012; Zeigler-Hill & Bresser, 2011), and perhaps on the expression of the different humorous behaviors.

Nevertheless, this study did not allow us to examine emotional characteristics of the participants and study the relation between perception of dark humor and individual variables such as emotional intelligence. Because dark humor may trigger particular emotional reaction, it would be interesting to identify the emotional and affective lexicon used by participants to express their feelings about dark cartoons and examine if men and women express in different way their feelings about this specific form of humorous situation.

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