

A Temperamental Understanding of Humor Communication and Exhilaratability

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This study examined humor creation from a communibiological perspective. Employing Eysenck's temperamental framework (based on the super traits of extraversion, neuroticism, and psychoticism – ENP), the study found positive relationships between humor orientation, humor assessment, and sense of humor with the super-trait extraversion. Additionally, an examination of the super-trait of exhilaratability (cheerfulness, seriousness, and bad mood) determined that humor assessment, humor orientation, and sense of humor related to exhilaratability. The STCI (State-Trait Cheerfulness Index) and the ENP index were shown to be related instruments. Overall, it was found that while an individual's sense of humor may be culturally influenced, her or his propensity to use humorous communicative messages (jokes and stories) is largely temperamentally based.

KEY CONCEPTS humor, temperament, exhilaratability, communibiology, communication traits

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Over the last twenty years, researchers have said that humor is situational (Martin & Leftcourt, 1984), cognitively based (Latta, 1999), driven by social groups (Wolosin, 1975), teachable (Ziv, 1988), an aspect of intelligence (Shade, 1991), and constantly changing (Carroll, 1989). Additionally, many studies have found positive benefits related to humor: humor helps us deal with stress (Cann, Holt, & Calhoun, 1999); humor helps us deal with family problems (Brooks, Guthrie, & Gaylord, 1999); humorous people are more popular (Wanzer, Booth-Butterfield, & Booth-Butterfield, 1996); humorous people have higher self-concepts (Svebak, 1975; Ziv, 1981); and many other positive attributes. Most humor research has been based on learning theory models. Researchers have believed that using humor, or teaching people to be humorous, will help them deal with stress and family problems, it will make them more popular, and they will have improved self-concepts. Unfortunately, there are many problems with social learning theory, most notably the effect sizes

produced by research employing these theories typically have been very small (Beatty, McCroskey, & Valencic, 2001).

The current research project set out to determine whether there was a possible connection between temperament and the use of humor in communication. Most of the humor research has been learning theory based, while a handful has been conducted in psychobiology, one of the disciplines that provided the foundation of the communibiological paradigm. This study involves a communibiological (temperamental) examination of humor creation (using one's sense of humor to formulate humorous communicative messages - both verbal and nonverbal). An examination of the research on humor from a psychobiological standpoint and an examination of relevant communibiological research lead to several hypotheses and research questions.

Humor Research

Humor Definition. To understand what humor is, an analysis of the definition of humor is offered. Some people have gone as far as to say that humor is like obscenity, you just know it when you see it (Morreall, 1997). (This definition alludes to the Supreme Court case where it was said that obscenity is something that you know when you see it.) Unfortunately, many of the theoretical and applied definitions of the term "humor" are related only to jokes and joke telling (Freud, 1960; James, 1896; Booth-Butterfield & Booth-Butterfield, 1991) or laughing (Gruner, 1996; Nosanchuck & Lightstone, 1974; Giles & Oxford, 1970). However, most humor psychotheorists do not see joke telling and laughing as the major factors for humor (Derks, 1996; Attardo, 1994). Attardo and Raskin (1991) argue for a more strict definition of humor, Latta (1999) argues that avoiding a narrow-scoped definition of humor is ultimately the best for research because it prevents rare, yet actual, forms of humor from being overlooked in its analysis. Attardo (1994) noted that the reason researchers may have such a difficult time defining the word "humor" probably has to do with the fact that it goes back to Medieval medicine and before that to the Ancient Greeks. No matter the definition we use for the word "humor", the associations linked to humor are very strong. Also, at humor's basis, humor as a construct is communicative in orientation. Meyer (2000) explored the various theories of humor, all of which have communication related aspects.

Exhilaration, Cheerfulness, and Humor. Along with the problems seen in understanding what humor is, humor research has also attempted to make the connection between exhilaration, cheerfulness, and humor. Ruch (1993) defines exhilaration as, "an emotion construct denoting a temporary increase in cheerful state that is observable in behavior, physiology, and emotional experience, and that occurs in response to humor but, also to other stimuli" (p. 605). Ruch goes on to explain that "exhilaration" is of Latin origin (*hilaris* means "cheerful"), and is used by the author to denote the process of making cheerful or the temporary rise in a cheerful state. Exhilaration is often confused with humor, but exhilaration can happen under other influences such as tickling and nitrous oxide (Ruch & Stevens, 1995). At the same time, Ruch and Kshler (1999) realized that cheerfulness is not only a state but a temperamental construct. Meumann (1913), as discussed by Ruch and Kshler, believed that cheerfulness was one of 12 basic temperaments and described the basic differences between cheerfulness, seriousness, and bad mood. Though cheerfulness as a state and trait facilitates exhilaratability, it was argued that factors that antagonize

cheerfulness (seriousness and bad mood) needed to be considered as well (Ruch, 1990). For this reason, Ruch (1993) created the State-Trait Cheerfulness Index (STCI) which measures cheerfulness, seriousness, and bad mood. Trait cheerfulness is composed of a tendency for cheerful moods, a low threshold for smiling and laughter, a composed view of adverse life circumstances, a broad range of active elicitors of cheerfulness and smiling, and a generally cheerful interaction style. The second component of the STCI, trait seriousness, is composed of a tendency for serious states, a perception that even everyday happenings are important and deserving of thorough and intensive consideration, the tendency to plan ahead and set long-range goals, the tendency to prefer activities for which concrete, rational reasons can be produced, the preference for a sober, object-oriented communication style, and a humorless or dull attitude about cheerfulness-related matters. The final component of Ruch's (1993) STCI was bad mood. Bad mood refers to individuals who are generally in a bad mood, sad (despondent and distressed), ill-humoredness (sullen and grumpy or grouchy feelings), and ill-humored in situations related to cheerfulness evoking situations.

A number of studies have been completed examining exhilaratability from a trait perspective. Ruch (1997) found that people who scored higher on trait cheerfulness instruments have a lower threshold for smiling and laughing and tend to do so for longer periods of time than those who score lower on the instruments. The researcher went on to find that trait cheerfulness was a better predictor of intensity of exhilaration than extraversion. This supported the notion that the specific emotion-related traits might be of higher utility than the more global super trait, extraversion. These two findings mirrored the findings Ruch and Stevens (1995) found related to nitrous oxide. In this study, the researchers administered nitrous oxide to participants and then recorded their exhilaratability levels. Ruch and Stevens found that people who were highly trait cheerful reported greater mood increases than those under a placebo or those who had low trait cheerfulness scores. In this respect, a definite neurological reaction could be seen in the individuals who were highly trait cheerful that made them experience more exhilaration. Conversely, those who were low trait cheerful individuals did not experience exhilaration; they just felt the numbing effect of nitrous oxide.

Cheerfulness has also been related positively with Eysenck's (1947) concept of extraversion (Ruch, 1998; Ruch & Carrell, 1998). Ruch and Carrell found that though the relationship between cheerfulness and sense of humor was seen as very strong and significant. The researchers were quick to point out that at least two factors are necessary for a humorous attitude to develop - a cheerful temperament and prior (successfully mastered) adverse life experiences, which implied that cheerfulness and humor are different (although possibly related) constructs.

Communibiological Foundations of Humor. Communibiology proposes that human communication at a basic level is genetically driven (Beatty, McCroskey, & Valencic, 2001; McCroskey & Beatty, 2000). The concept of examining communication traits is nothing new to the discipline of communication studies (Behnke, Carlisle, & Lamb, 1974), but communibiology has been a difficult notion for some researchers in the field (Condit, 2000). The biggest push in Communibiology came from McCroskey's (1997) lecture at the National Communication Association's annual convention on what he termed the "communibiological perspective" of human communication. This view of communication argues that the ways in which we communicate are not due to social learning, but instead are often neurobiologically driven.

The formation of modern genetic research as we know it today started in 1865 with the groundbreaking treatise on heredity by an Austrian monk named Gregor Mendel (Koerner, 1997). Mendel was the first scientist to propose that humans were actually similar to their biological parents through a process he called "heredity." Many of these traits have historically been written-off as byproducts of one's culture. However, genetic codes have been linked to the traits of impulsiveness, openness, conservatism, hostility, and intelligence (Nash, 1998) just to name a few. The arena of genetic behavioral research is just barely at the initiation stage. Only recently has the sequencing of the 3.1 billion chemical "letters" that make up human DNA, which makes up the human genome, been completed (Lemonick, 2000). It will be years before much of this information is publicly accessible and fully interpretable. Until then, pioneering researchers like Dean Hammer will use the natural sciences to investigate behavioral science theories and variables (Hammer & Copeland, 1999).

To research the area of communibiology, researchers have primarily relied on self-report data stemming from psychobiological instruments that measure an individual's temperament. Examining the concept of neurobiology as it was at the turn of the century led Eysenck to develop his model of personality. Eysenck's (1998) model of personality, which has origins back in the 1940s, contains five distinct aspects: genetic personality determinants (DNA), biological intermediaries (limbic system/arousal), psychometric trait constellations (extraversion, neuroticism, and psychoticism), experimental studies (conditioning, sensitivity, vigilance, perception, memory, and reminiscence), and social behavior (sociability, criminality, creativity, psychopathology, and sexual behavior) (Eysenck, 1998). In the original studies conducted by Eysenck during World War II, he found some very interesting results. Not only did Eysenck's two primary factors of psychometric trait constellations (extraversion and neuroticism) predict a person's body size and growth rates, but also the constellations accounted for a good deal of the variance in neuroses, hypnotic suggestibility, conformity, intelligence, aspiration, rigidity, and humor appreciation (Eysenck, 1998). Eysenck's two-factor temperament model later had the third factor of psychoticism added to it for greater understanding of the human temperament (Eysenck, Eysenck, & Barrett, 1985). Eysenck's work paved the way for the psychological paradigm shift now referred to as psychobiology, and psychobiology has led to the paradigm shift seen in the ushering in of communibiology. In the arena of communibiology, researchers have looked at interpersonal communication (Beatty & McCroskey, 1998b), communication apprehension (Beatty, McCroskey, & Heisel, 1998; Beatty & Valencic, 2000; Kelly & Keaten, 2000), verbal aggressiveness (Valencic, Beatty Rudd, Dobos, & Heisel (1998), communicator style (Bodary & Miller, 2000; Horvath, 1995), socio-communicative orientation (Cole & McCroskey, 2000), family communication patterns (Wrench, 2001), communication competence (Wrench, 2001), and nonverbal immediacy (Cole, 2000).

Humor and Exhilaratability as Communibiological Variables. Humor as a communication construct has shown a number of positive attributes through the research in the areas of humor in the classroom, doctor's office, and personal life. Relationships have been seen between a teacher's use of humor, both physical and verbal, and positive teacher evaluations (Bryant, Cominsky, Crane, & Zillmann, 1980; Javidi, Downs, & Nussbaum, 1988), student learning (Ziv, 1988; Sachacht & Stewart, 1990; Gorham and Chirtophel, 1990; Wrench & Richmond, 2000), and student affect towards a class and its instructor (Wanzer & Frymier, 1999; Wrench & Richmond,

2000). Wanzer, Booth-Butterfield, and Booth-Butterfield (1997) found that nurses who had higher humor orientations had stronger coping skills in the medical profession. Wrench and Booth-Butterfield (2001) found that physician humor increases patient satisfaction in the medical interview. Wanzer, Booth-Butterfield, & Booth-Butterfield (1996) found that humorous people tended to have more friends and saw themselves as being more popular. Svebak (1975) and Ziv (1981) found that the more humorous a person was, the higher her or his self-concept was. Through this research, it can be seen that humorous communication is a very positive and beneficial aspect in people's lives.

Unfortunately, these benefits seen in the literature on humor may not be genetically possible for everyone. Many temperamental and physiological findings have been found in regards to humor. Derk (1996) discussed that not only is humor a temperamental or personality construct, but humor and its physical response, laughter, are both a psychological and physiological response pattern that "activates the entire cortex sending waves of positive and negative polarization through both hemispheres. Sequential and parallel processing mechanisms are involved" (p. xvii). Humor has also been associated with physiological arousal (Godkewitsch, 1996; Schachter & Singer, 1962; Marshall & Zimbardo, 1979). A number of studies have examined personality as a determining factor in humor appreciation (Eysenck, 1942, 1998; Fine, 1975; Zillman & Cantor, 1972; McGhee, Ruch, & Hehl, 1990). Booth-Butterfield and Booth-Butterfield (1991) noticed differences in humorous communicative behavior between people who were highly humorous and people who were not humorous.

Hypotheses & Research Questions. Despite the fact that a lot of research has been conducted examining humor from a psychobiological standpoint, all of the research has been conducted seeing how people respond to stimuli by examining a person's sense of humor (Ruch & Carrell, 1998). There has yet to be any research examining whether there is a genetic basis for those who communicate in humorous manners. In research conducted by Eysenck (1942, 1998) and Ruch (1997), it was observed that sense of humor, humor appreciation, and cheerfulness were related to the super trait of extraversion. Extraversion may be able to count for a significant amount of the variance in humor creation. Ruch and Carrell (1998) propose that a person's humorous attitude is developed because of a cheerful temperamental trait along with prior adverse life experiences. Since we know that arousal is linked to humor (Godkewitsch, 1996; Schachter & Singer, 1962; Marshall & Zimbardo, 1979) and since neurotics will deal with adverse life experiences in relation to the arousal level of the cerebral cortex, it is possible that a person's level of neuroticism could account for some of the variance in a person's sense of humor and ability to create humorous messages.

H1: Extroversion and Neuroticism are positively related to humor orientation and humor assessment.

H2: Extroversion and Neuroticism are positively related to sense of humor.

Previous research has shown that trait cheerfulness and sense of humor are related to each other but are clearly different constructs (Ruch, 1997, In Press). As stated above, no research has examined whether humor creation is temperamentally based. Humor creation may be based on one's cheerfulness and sense of humor.

RQ1: What are the relationships between humor orientation, humor assessment, and sense of humor with cheerfulness, seriousness, and bad mood?

In research conducted by Ruch (1997), he noticed that the trait cheerfulness was related to Eysenck's (1998) concept of extraversion. In subsequent research, Ruch (1998) found relationships between the STCI and Eysenck & Eysenck's (1985) temperamental framework. McGhee (1996) believed that a human's ability to play on her or his trait playfulness is a primary component of humor. McGhee also believed that as a child grows older he or she is taught to be serious, often making individuals lose their ability to be playful. Ruch (1997) showed that cheerfulness was able to predict part of the variance in each of McGhee's (1996) facets of sense of humor. Based on this finding, McGhee's implications are simply to teach a person to be more cheerful so that they are less serious and have fewer bad moods. According to Eysenck and Eysenck (1985), an aspect of neuroticism is moodiness. With this realization, seriousness and bad mood are probably not learned like McGhee (1996) suggests, but are probably other temperamental expressions that help in the understanding of the super trait concept of exhilaratability. While Ruch (1998) examined the STCI and Eysenck, Eysenck, and Barrett's (1985) temperamental framework, analyses were not conducted to see how much an individual's temperament accounts for the variance in exhilaratability.

RQ2: What are the relationships of cheerfulness, seriousness, and bad mood with extroversion, neuroticism, and psychoticism?

METHOD

Participants

Participants were first-semester students at a large Middle Atlantic public university taking a lower level communication course that enrolls students from all over the university. The sample consisted of 225 participants, 113 (50.2 %) males, 79 (35.1 %) females, and 33 (14.6%) who did not respond to the sex question. Participants were asked to respond to a set of five survey instruments that dealt with their individual humorous communication style and temperament. The survey took approximately thirty minutes to complete. Data used in this study was collected during the 9th week of a 16-week semester. The participants all received extra credit for their participation in this study.

Measures

Richmond Humor Assessment Instrument. The Richmond Humor Assessment Instrument (RHAI) instrument is a 16-item, self-report measure that uses a 5-point Likert format ranging from "strongly disagree" to "strongly agree." The RHAI was developed by Richmond (1999) to measure an individual's predisposition to enact humorous messages during an interaction (Richmond, Wrench, & Gorham, 2001). Scores for the RHAI can range from 16-80. In this sample, the range was from 40 to 80. The RHAI used in this study had a $M = 63.2$ with a $SD = 8.84$. The RHAI had an alpha reliability of .89.

Humor Orientation Scale. The Humor Orientation Scale (HO) instrument is a 17-item, self-report measure that uses a 5-point Likert format ranging from "strongly

disagree" to "strongly agree." The HO was developed by Booth-Butterfield and Booth-Butterfield (1991). It was originally intended to be an encompassing look at an individual's overall humor orientation. As noted by Wrench and Richmond (2000), the HO does not test for an overall humor orientation but a tendency for an individual to participate in humorous story and joke telling. Though this convergent validity problem does skew the original analysis of this instrument, it is still a reliable measure for analyzing a person's humorous story and joke telling. Scores for the HO can range from 17-85. In this sample, the range was from 18 to 85. The HO used in this study had a $M = 60.22$ with a $SD = 11.78$. The HO had an alpha reliability of .89. In this study, the HO and the RHAI were positively correlated with each other $r(225) = .51, p < .0001$.

State-Trait Cheerfulness Index. The State-Trait Cheerfulness Index (STCI) instrument is a 60-item, self-report measure that uses a 5-point Likert format ranging from "strongly disagree" to "strongly agree." The STCI was developed by Ruch (1993) to measure an individual's state and trait exhilaratability. According to Ruch (1997), the STCI is based on three components: cheerfulness, seriousness, and bad mood. Scores for the cheerfulness component of the STCI can range from 20 to 100. In this sample, the range was from 37 to 100. The cheerfulness measure used in this study had a $M = 74.14$ with a $SD = 12.3$. The cheerfulness component of the STCI had an alpha reliability of .90. The second component of the STCI, trait seriousness, has scores that can range from 20 to 100. In this sample, the range was from 26 to 87. The cheerfulness measure used in this study had a $M = 60.21$ with a $SD = 9.64$. The serious component of the STCI had an alpha reliability of .77. The final component of the STCI, bad mood, has scores that can range from 20 to 100. In this sample, the range was from 22 to 88. The bad mood measure used in this study had a $M = 52.13$ with a $SD = 12.6$. The bad mood component of the STCI had an alpha reliability of .88.

Sense of Humor Scale. McGhee's (1996) Sense of Humor Scale (SHS) is a 24-item, self-report measure that uses a 7-point Likert format ranging from "strongly disagree" to "strongly agree." Since all of the items were unidirectional, reverse coded questions for each of the original 24 items were generated for a 48-item measure. The original conceptualization of McGhee's (1996) SHS has six components that measure an individual's enjoyment of humor, tendency to laugh, use verbal humor, finding humor in every day life, ability to laugh at her or himself, and use humor during times of stress. Alpha reliabilities were calculated for each of the six sub constructs: enjoyment of humor .66, laughter .76, verbal humor .84, finding humor in every day life .86, laughing at yourself .67, and humor under stress .77. Since the alpha reliabilities were generally low, a factor analysis was conducted to determine the actual loadings of the alleged constructs. A factor analysis was performed on the SHS, which revealed a strong primary factor. In essence, the SHS is better analyzed as a holistic construct instead of its various parts. An alpha reliability was calculated for the entire measure at .95.

Temperament Measures. Eysenck, Eysenck, and Barret's (1985) 12-item measure of psychoticism ($M = 31.48, SD = 6.35$) was embedded within a general questionnaire consisting of Eysenck's (1998) 10-item measures of extraversion ($M = 35.5, SD = 6.17$) and neuroticism ($M = 27.53, SD = 6.9$). The means and standard deviations found in this study are similar to previous studies conducted using this measure (Beatty, Valencic, Rudd, & Dobos, 2000) Alpha reliabilities were conducted for the three measures: extraversion .76, neuroticism .79, and psychoticism .60. Extraversion, as previously discussed, has been identified by personality theorists as an important variable in the understanding of an individual's response to humor (Eysenck, 1942,

1998; Ruch, 1997; Ruch & Carrell, 1998).

RESULTS

The first hypothesis predicted that extroversion and neuroticism would be positively related to humor orientation and humor assessment. To complete this analysis, Eysenck's (1998) temperament scale (ENP) was correlated with both the RHAI and HO. While it was predicted that only extraversion and neuroticism would be positively related with the RHAI and HO, measuring all three of Eysenck's super traits is important because it is the combination of the three traits together that give a holistic understanding of human behavior (Eysenck, Eysenck, & Barret, 1985). The results for this hypothesis can be seen in Table 1. The RHAI correlated positively with extraversion $r(224) = .42, p < .0001$; and negatively with neuroticism $r(224) = -.16, p < .01$; and was not significantly related to psychoticism $r(224) = -.10, p > .05$. The HO correlated positively with extraversion $r(224) = .63, p < .0002$, negatively with neuroticism $r(224) = -.37, p < .0001$, and negatively with psychoticism $r(224) = -.30, p < .0001$. A multiple correlation analysis was conducted to determine how well ENP predicts humor creation (RHAI and HO). The linear combination of ENP was related to the RHAI, $F(3, 220) = 15.40, p < .0001$. ENP accounted for 42% ($r = .42$) of the variance in the RHAI. The linear combination of ENP was related to the HO, $F(3, 220) = 57.64, p < .0001$. ENP accounted for 66% ($r = .66$) of the variance in the HO.¹

The second hypothesis examined the relationship between extroversion, neuroticism, and psychoticism and sense of humor. The results for this research question can be seen in Table 1. Sense of humor was positively correlated with extraversion $r(224) = .15, p < .02$, but sense of humor was not significantly correlated with either neuroticism $r(224) = .08, p > .05$ or psychoticism $r(224) = -.02, p > .05$. A multiple correlation analysis was conducted to determine how well ENP predicts sense of humor (SHS). The linear combination of ENP was related to the SHS, $F(3, 220) = 3.48, p < .05$. ENP accounted for 21% ($r = .21$) of the variance in the SHS.

TABLE 1
Correlations Of HO, RHAI, SH, with ENP

	RHAI	HO	SH
Extraversion	.42 (.51)***	.63 (.76)**	.15 (.18)*
Neuroticism	-.16 (-.19)*	-.37 (-.44)***	.08
Psychoticism	-.10	-.30 (-.41)***	-.02
Multiple r	.42 (.53)***	.66 (.82)***	.21 (.25)*

df = 224

* $p < .05$, ** $p < .001$, *** $p < .0001$

As a follow up analysis, a canonical correlation was conducted using the temperamental super traits (extraversion, neuroticism, and psychoticism) as predictors of humor assessment, humor orientation, and sense of humor. This analysis produced two significant canonical variates with an adjusted canonical correlation of .66 [$F(d.f. 9) = 17.90, p < .0001$] and .20 [$F(d.f. 4) = 3.05, p < .05$]. In the first canonical, humor orientation had the dominant loading on the variate (.993), while humor assessment had a more moderate loading (.595), and sense of humor had a minimal

loading (.163). Only one of the predictor variables (extraversion) was loaded highly on the variate (.950). Both neuroticism (-.553) and psychoticism (-.439) were negatively related to the variate. In the second canonical, sense of humor was the highest loaded variable (.806), while humor assessment had a more moderate loading (.531), and humor orientation had a negligible loading (-.043). All three of the predictor variables were loaded on the variate, but only neuroticism was loaded highly on the variate (.694), while extraversion (.298) and psychoticism (.316) were minimally related to the variate.

The first research question examined the relationship between humor creation (RHAI and HO), sense of humor, and trait cheerfulness. The results for this research question can be seen in Table 2. The RHAI correlated positively with trait cheerfulness $r(221) = .39, p < .0001$ and positively with sense of humor $r(225) = .18, p < .005$. The HO correlated positively with trait cheerfulness $r(221) = .63, p < .0001$ and positively with sense of humor $r(225) = .19, p < .003$. Sense of humor and trait cheerfulness also were positively correlated with each other $r(221) = .18, p < .007$. A multiple correlation analysis was conducted to determine how well STCI predicts humor creation (RHAI and HO) and sense of humor (SHS). The linear combination of STCI was related to the RHAI, $F(3, 208) = 14.47, p < .0001$. STCI accounted for 42% ($r = .42$) of the variance in the RHAI. The linear combination of STCI was related to the HO, $F(3, 208) = 52.31, p < .0001$. STCI accounted for 66% ($r = .66$) of the variance in the HO. The linear combination of STCI was related to the SHS, $F(3, 208) = 5.21, p < .001$. STCI accounted for 26% ($r = .26$) of the variance in the SHS.

TABLE 2
Correlations Of HO, RHAI, SH, with STCI

	RHAI	HO	SH
Cheerfulness	.39 (.44)***	.63 (.70)***	.18 (.19)**
Seriousness	-.09	-.14 (-.16)*	-.09
Bad Mood	-.27 (-.33)***	-.50 (-.60)***	-.01
Multiple r	.42 (.48)***	.66 (.76)***	.26 (.30)**

df = 212

* $p < .05$, ** $p < .001$, *** $p < .0001$

As a follow up analysis, a canonical correlation was conducted using exhilaratability (cheerfulness, bad mood, and seriousness) as predictors of humor assessment, humor orientation, and sense of humor. This analysis produced two significant canonical variates with adjusted canonical correlations of .65 [$F(d.f. 9) = 16.44, p < .0001$] and .21 [$F(d.f. 4) = 2.81, p < .05$]. In the first canonical, humor orientation had the highest loading on the variate (.991), while humor assessment had a more moderate loading (.619), and sense of humor had a minimal loading (.248). Only one of the predictor variables (cheerfulness) was loaded highly on the variate (.971). Both seriousness (-.217) and bad mood (-.74) were modestly negatively related to the variate. In the second canonical, sense of humor was the highest loaded variable (.907), while humor assessment had a minimal loading (.296), and humor orientation had a negligible loading (-.103). Only one predictor variable (bad mood; .537) had a meaningful loading on the variate. Cheerfulness had a negligible positive loading

(.097) and seriousness had a small negative loading (-.270).

The second research question set out to determine the relationships of cheerfulness, seriousness, and bad mood with extraversion, neuroticism, and psychoticism. The results for this research question can be seen in Table 3. Cheerfulness was positively related to extraversion $r(221) = .74, p < .0001$, negatively related to neuroticism $r(221) = -.42, p < .0001$, and negatively related to psychoticism $r(221) = -.36, p < .0001$. Seriousness was not significantly related to extraversion $r(223) = -.09, p > .05$, positively related to neuroticism $r(223) = .41, p < .0001$, and negatively related to psychoticism $r(223) = -.16, p < .02$. Bad mood was negatively related to extraversion $r(212) = -.42, p < .0001$, positively related to neuroticism $r(212) = .75, p < .0001$, and positively related to psychoticism $r(212) = .26, p < .0001$. A multiple correlation analysis was conducted to determine how well ENP predicts the components of the STCI: cheerfulness, seriousness, and bad mood. The linear combination of ENP was related to the cheerfulness, $F(3, 217) = 110.90, p < .0001$. ENP accounted for 78% ($r = .78$) of the variance accounted for in cheerfulness. The linear combination of ENP was related to the seriousness, $F(3, 219) = 18.32, p < .0001$. ENP accounted for 45% ($r = .45$) of the variance accounted for in seriousness. The linear combination of ENP was related to the bad mood, $F(3, 208) = 114.20, p < .0001$. ENP accounted for 79% ($r = .79$) of the variance accounted for in bad mood.

TABLE 3
Correlations Of STCI with ENP

	Cheerfulness	Bad Mood	Seriousness
Extraversion	.74 (.89)***	-.42 (-.51)***	-.09
Neuroticism	-.42 (-.50)***	.75 (.90)***	.41 (.53)***
Psychoticism	-.36 (-.50)***	.26 (.36)***	-.16 (-.24)*
Multiple r	.78 (.97)***	.79 (.99)***	.45 (.60)***

* $p < .05$, ** $p < .001$, *** $p < .0001$

As a follow up analysis to the second research question, a canonical correlation was conducted using Eysenck's super traits (extraversion, neuroticism, and psychoticism as predictors of exhilaratability (cheerfulness, bad mood, and seriousness). This analysis produced three significant canonical variates with an adjusted canonical correlation of .82 [$F(d.f. 9) = 56.72, p < .0001$], .63 [$F(d.f. 4) = 35.77, p < .0001$], and .27 [$F(d.f. 1) = 16.67, p < .0001$]. Extraversion (.770) and neuroticism (-.826) had the highest loadings on the first variate. Psychoticism (-.376) had a moderate negative loading. Cheerfulness (.857) and bad mood (-.912) were loaded highly on the variate. Seriousness (-.336) was modestly related to the variate. On the second variate, extraversion (.599) and neuroticism (.536) were positively loaded on the variate, while psychoticism had a negligible loading (-.214). All three of the criterion variables were positively loaded on the variate: cheerfulness (.515), bad mood (.462), and seriousness (.394). The third variate had only one high loading, psychoticism (.902), while extraversion (.217) and neuroticism (-.174) were minimally loaded. For the criterion variables, only seriousness had a high loading (-.820). Bad mood (.117) and cheerfulness (-.022) were negligibly loaded.

DISCUSSION

Overall, this study yielded a number of interesting findings that aid in the understanding of humor communication. In order to examine all of the implications of this study, the three major research areas (humor creation and temperament, humor creation and exhilaratability, and exhilaratability and temperament) will be handled separately in this discussion.

Humor Creation and Temperament

Our first hypothesis was only partially supported in this study. We had predicted that humor orientation (HO) and humor assessment (HA) would be positively related to both neuroticism and extraversion. Instead, humor orientation was positively related with extraversion and then negatively related to both neuroticism and psychoticism, while humor assessment was positively related to extraversion and negatively related to neuroticism with no relation to psychoticism. The linking between both the HO and the HA with extraversion was predicted, and extraversion has been consistently associated with humor in the literature (Eysenck, 1998; Ruch, 1993, 1997). In fact, one of the components of extraversion that Eysenck (1998) noted was hysteria, which is the root of the word "hysterical." Hysterical is commonly associated with the word humorous both by lay people and by Eysenck (1998) himself. People who are more socially outgoing and enjoy interacting with other individuals would be more likely to use a variety of communication tools like humor when interacting with other people because humor helps them entertain and keep an audience.

The interesting difference found in the relationships with both the HO and the HA with extraversion is the amount of variance accounted for by extraversion. Extraversion accounts for 21% more of the variance in humor orientation than it accounts for in humor assessment. Humor orientation is an individual's tendency to use humorous jokes and stories as a communication medium, while humor assessment takes into account other facets of humor beyond jokes and stories. What we can see in these relationships is that extraversion is accounting for an individual's tendency to tell stories and jokes, not so much an individual's holistic humor level, which is tested for by the Richmond Humor Assessment Instrument. This finding further validates the problem with Booth-Butterfield and Booth-Butterfield's (1991) Humor Orientation instrument noted by Wrench and Richmond (2000).

A second finding from the first hypothesis was the negative relationship seen by both humor orientation and humor assessment with neuroticism. According to Beatty, McCroskey, and Valencic (2001), neuroticism is an individual's proneness to experience and react to anxiety. While some people from the outside may see highly anxious people as humorous because of their actions under anxiety, the people experiencing the anxiety are probably so focused on themselves and not on using humorous messages that they would not see themselves as highly humorous even if they were. At the same time, it is possible that highly neurotic people simply are so focused on their anxiety that it prevents them from using humor as a communicative tool.

The findings related to psychoticism are unique because they are different for humor orientation and humor assessment. Since joke and humorous story telling are innately social activities, the anti-social nature exhibited by high psychotics would explain why they avoid using these communicative messages. The interesting

implication that this finding has deals with the lack of a significant finding between humor assessment and psychoticism. Although the lack of a finding could easily be a sampling mishap, it is more likely that we are seeing the lower degree that humor assessment is accounted for by the variance of Eysenck's temperamental framework. The multiple correlation analysis clearly showed that extraversion, neuroticism, and psychoticism accounted for 66% of the variance in humor orientation, but only 42% of the variance in humor assessment. To understand why the difference is occurring, an examination of the results from the second hypothesis is needed.

The second hypothesis predicted that an individual's sense of humor would be positively related with extraversion and neuroticism. While Ruch (1997) had proposed that an individual's sense of humor was possibly genetically based, this study shows otherwise. It appears that an individual's sense of humor is probably culturally based, and has nothing to do with an individual's genetic makeup. At the same time, Ruch and Kshler (1999) noticed that individuals who are highly cheerful (related to extraversion by Ruch and Carrell, 1998) have higher scores on sense of humor measurements than those who do not, so there may be a relationship between an individual's level of humor creation and sense of humor, but they are not driven by the same external variables. This finding was in some ways surprising because extraversion only accounted for 20% of the variance of sense of humor. In this light, it is possible that a person's desire to use humorous messages is temperamentally based, but what he or she learns is humorous is more culturally learned.

To further understand the findings of the first two hypotheses, a canonical correlation was conducted to examine the relationships between humor orientation, humor assessment, and sense of humor with extraversion, neuroticism, and psychoticism. The results of the canonical correlation showed humor orientation loading highly on the first variate with extraversion. On the second variate, sense of humor loaded very highly. Humor assessment loaded moderately on both variates. This further explains the convergent validity problem with the Booth-Butterfield and Booth-Butterfield (1991) humor orientation instrument. The RHAI is a more general approach to humor linking message creation with sense of humor (Richmond, Wrench, & Gorham, 2001). The impact of the differences between these two instruments is seen in the current study. An individual's ability and desire to tell jokes and humorous stories (HO) is temperamentally driven, approximately 76% after disattenuation. At the same time, an individual's sense of humor (SHS) is barely temperamentally driven, approximately 25% after disattenuation. Apparently, sense of humor is a culturally constructed concept. This notion supports many of the linguistic theories of humor (Attardo, 1994). A person's true humor assessment is going to be impacted by either her or his sense of humor and her or his tendency to use humorous messages (jokes and humorous story telling). If this is true, then an individual's humor assessment should fall somewhere between joke and humorous story telling and sense of humor with regards to variance accounted for by the ENP, which is exactly what was found. An individual's humor assessment is accounted for by approximately 53% after disattenuation. In essence, the RHAI is a more valid instrument to use to investigate an individual's trait humor communication because it is impacted by both sense of humor and message creation.

Humor Creation and Exhilaratability

In many ways, the findings related to exhilaratability and humor creation are similar to the findings previously discussed. Humor orientation was positively related

to cheerfulness and negatively related to seriousness and bad mood, while humor assessment is positively related to cheerfulness and negatively related to bad mood, while not being related at all to seriousness. Additionally, sense of humor was minimally related to cheerfulness. Since cheerfulness is an upbeat interaction style that co-exists with laughing and play, the findings that highly cheerful people are more likely to tell humorous stories and jokes is not surprising. Interestingly, the relationship between cheerfulness and humor orientation, humor assessment, and sense of humor follows the same statistical path. It appears that trait cheerfulness works in the same way that extraversion did in the previous set of results.

The canonical analysis helped to further understand the relationships with humor creation and exhilaratability. In this analysis, the loadings mirrored the correlations discussed above. Humor orientation loaded the highest on the first variate, with humor assessment in the mid-range, and sense of humor being minimally loaded. When looking at the exhilaratability components, cheerfulness was the highest loaded factor on the first variate, but bad mood was also highly negatively loaded with seriousness being minimally loaded. The second variate was predominantly sense of humor and a moderately positive bad mood. Overall, this analysis is just further validation that sense of humor, while related to humor assessment and humor orientation, is determined by an individual's culture, not her or his neurological makeup.

Exhilaratability and Temperament

The last major finding in this study came from the further investigation of Ruch's (1993) STCI model of exhilaratability and Eysenck's ten-item measures for extraversion and neuroticism and Eysenck, Eysenck, and Barret's (1985) 12-item measure of psychoticism. The relationship between cheerfulness and extraversion was originally seen by Ruch and Carrell (1998). The results of the relationship between cheerfulness and extraversion in this study are similar to those found by Ruch and Carrell. Unfortunately, the Ruch and Carrell (1998) study did not look for temperamental components at all levels of the exhilaratability construct. The fact that neuroticism and psychoticism were negatively related to cheerfulness was not surprising since cheerfulness is a very pro-social and non-anxious trait and state. The second finding of this question looked at whether seriousness was a trait concept, or as McGhee (1996) proposed a learned state of being. Seriousness was not related to extraversion, but was related positively to neuroticism and negatively to psychoticism. Admittedly, neuroticism only accounts for about 41% of the variance in seriousness, but this is enough to take credence away from McGhee's (1996) notion that people learn to be serious and that playfulness (cheerfulness) is a natural state of being for all people. In fact, it appears that cheerfulness and seriousness are two temperamental factors that do compete with each other. One is not learned and the other natural - both have genetic bases. Bad mood, the third aspect of exhilaratability, was negatively associated with cheerfulness, and positively related to neuroticism and psychoticism. Neuroticism accounts for 75% of the variance in an individual's bad mood. This is not surprising since Eysenck and Eysenck (1985) saw moodiness as an aspect of neuroticism. At the same time, psychoticism does account for about 30% of the variance of an individual's bad mood.

To an extent, Ruch's (1993) conceptualization of exhilaratability and Eysenck's conceptualization of an individual's temperament appear to be overlapping. The ENP

accounted for 97% of the variance in cheerfulness, 60% of the variance in seriousness, and 99% of the variance in bad mood after disattenuation. The canonical analysis further depicts the relationship between these two instruments. The first variate was composed of two highly loaded predictor variables: extraversion (positively) and neuroticism (negatively). The same relationship was seen in the loadings of cheerfulness (positively) and bad mood (negatively) on the first variate. The high relationships between cheerfulness and extraversion and bad mood and neuroticism depicts that while these variables are clearly different constructs, they are accounting for a lot of the same variance. The second variate, consists of moderate loadings of all three factors from both constructs (temperament and exhilaratability). Ultimately, the other two variables (seriousness and psychoticism) load primarily on the final variate. Although seriousness and psychoticism are negatively related, the two variables help to round out the constructs they are ultimately representing. Overall, although exhilaratability and temperament are clearly related, they ultimately examine human behavior in slightly different fashions.

CONCLUSION

Communication using humorous messages has been shown to have roots in our genetics, and is not simply a learned orientation like it was once thought. Though it appears what we find and do not find humorous (sense of humor) is probably culturally taught, our tendency to communicate using humorous stories, jokes, and nonverbal patterns is probably genetically based. The results of the present study provide evidence in support of a trait-model of humor-oriented communication. In the future, additional research into the actual creation of humorous messages should be conducted from a trait perspective. Additionally, further work should be conducted categorizing types of humorous messages from a trait perspective. The instruments used in this research dealing with humor creation (RHAI and HO) look at humor creation from a general approach. It is possible that different temperaments actually use different types of humorous messages. Although this study has focused its energy on the innate human variables related to humor, this does not mean that the researchers forget the importance of state nature of humor. A humorous statement or situation in one context can easily not be interpreted as humorous if presented in a different context, even by someone who is genetically hardwired to appreciate humor.

There are also serious implications for the research findings discussed in this report. Consistently, researchers in educational environments and organizational environments have attempted to teach people to be humorous. According to the findings discussed above, this may not be realistic. If a person's humor creating ability is genetically based, the only way this could be changed is through drugs or gene therapy. And as was seen in Ruch and Stevens' (1995) study on cheerfulness and nitrous oxide, drugs interact with one's biological chemical makeup and impact the way people feel and respond to humorous stimuli.

Research into the area of humor is still a relatively recent academic endeavor. As more and more benefits of humor surface, an increasing understanding of the holistic nature of humor is needed. This research may serve as a starting point for what will hopefully become a more complete understanding of what makes people laugh and what propels some to make other people laugh.

NOTES

1. It is important to recognize that these simple and multiple correlations are the appropriate estimates of variance accounted for in this study – not the square of the correlations as is the case in most research reported in the communication discipline. The correlation coefficient is the appropriate estimate of shared variance when that correlation is due to a latent variable (Jenson, 1980; Ozer, 1985; Tryon, 1929). In the present study, both the temperamental super traits and the communication traits are presumed to be produced by the latent cause of neurological structures. As Ozer (1985) explains, “Most trait models suggest that some latent variable underlies scores on both measures; and that the latent variable is responsible for the covariance between the measured variables... This is not determination of one variable by another, but determination of measured variables by a latent variable” (p. 312).

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