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Abstract

The purpose of this study was the development of a rating instrument to assess the use of humor in physician–patient interactions, and to compare humor use as a function of patients' socioeconomic status. The 46-item Physician–Patient Humor Rating Scale (PPHRS) was used to rate 246 audiotaped primary care interactions. Four subscales were reliable and valid, demonstrating correlations with patient satisfaction and reports of physician humor, with physician satisfaction and with separate affective communication ratings. There was a significant difference in use of humor as a function of patient socioeconomic status, such that there was greater mutual trust between physicians and high versus low income patients.

Keywords

- *humor*
- *physician–patient communication*
- *rating scale*

DYADIC communication in physician–

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patient interaction has been the focus of extensive study (Beck, Daughtridge, & Sloane, 2002; Moore et al., 2004). Task-focused communication (exchange of biomedical information) is distinct from socio-emotional communication (e.g. empathy, psychosocial talk, laughter) (Hall, Roter, & Katz, 1987). Humor in medicine and healing has received theoretical and anecdotal interest, but limited empirical attention (Seaward, 1992) although studies have verified the use of humor in various treatment contexts including hospital settings (Scholl, 2007), primary care visits (Sala, Krupat, & Roter, 2002) and interactions between patients and non-physician medical staff (Scholl & Ragan, 2003).

Humor can involve communication that elicits laughter, smiles, a sense of joy and/or amusement from listeners (Penson et al., 2005), and a more general 'comic, absurd, or incongruous quality' that renders something amusing (Humor, n.d.). Humor messages can be verbal or nonverbal, positive or negative in character (Granek-Catarivas, Goldstein-Ferber, Azuri, Vinker, & Kahan, 2005), and may indicate affiliation, self-enhancement, aggression and self-disparagement (Romero & Cruthirds, 2006). Humor can serve positive functions in physician–patient communication including: 'breaking the ice', relaxing the patient and encouraging rapport (Oliffe & Thorne, 2007) and it can be used negatively, such as to criticize (Penson et al., 2005).

Ethnographic methods have found that a hospital unit's use of humor increased provider–patient closeness, comfort and patient-centered care, and facilitated a more positive therapeutic setting enabling patients to assert their needs (Scholl, 2007) and self-denigrating humor was used by neurological patients to compensate for their perceived lower cognitive status vis-a-vis their physicians (Saunders, 1998).

The relationship between humor and satisfaction in physician–patient relationships is unclear. Physicians' use of humor was not correlated with patient satisfaction when visits were observed through a one-way mirror (Comstock, Hooper, Goodwin, & Goodwin, 1982); but physician satisfaction was higher when humor occurred during the visit (Weinberger, Greene, & Mamlin, 1981). Humorous utterances were coded in audiotaped primary medical visits, and total humor, positive humor, humor to reduce stress, light humor and patient-generated humor characterized visits in which patients were more satisfied (Sala et al., 2002).

Using physician–patient vignettes with possible physician responses, Linn and DiMatteo (1983) found that both physicians and consumers most preferred reassuring responses, followed by neutral and humorous. Granek-Catarivas et al. (2005) found, with questionnaires, that physicians and patients had different views of humor used in their interaction. Utilizing the Roter Interaction Analysis System (RIAS), Levinson, Roter, Mullooly, Dull and Frankel (1997) found that physicians who had no malpractice claims used humor more frequently and laughed more than physicians who had experienced malpractice claims.

Humor and group cohesion

Medical humor is subtle communication that improves solidarity among health professionals, emphasizing 'in-group' perceptions that exclude the 'out-group' (patients) (Nelson, 1992). Humor helps manage stress and strengthen in-group (e.g. doctors') relationships (Fox, 1959; Francis, 1994) but has potential for problematic alienation of the out-group, as shown in a sociological study where foremen (authority figures) directed sarcastic remarks toward factory workers (Seckman & Couch, 1989). Telling jokes about out-groups (e.g. ethnic minorities) exhibits social control by showing condemnation or expressing veiled dislike (Winick, 1976). These qualitative observations may apply to medical interactions, generating interesting research questions.

Humor and social power

Do various kinds of humor reflect status gaps, differences in social power and 'micro-inequities' in communication between physicians and patients (Rowe, 1990)? Patient income does affect health and health care (Adler & Newman, 2002), although the mechanism by which healthcare disparities operate is still under investigation, and may involve subtle disparities in physician–patient communication.

It is possible that positive humor may reduce the power differential between physicians and patients. In a qualitative study, prostate cancer patients reported less anxiety when their male physicians used humor (possibly reducing the hierarchy in the male physician–male patient relationship) (Oliffe & Thorne, 2007). Scholl (2007, p. 168) also observed a 'de-emphasis of power disparities' associated with humor, but social power, humor and other patient characteristics, such as income, have not been studied quantitatively. We might speculate that when more closely matched in income status, physician and

patient would employ more equal and positive subtle humor than when the patient is of much lower socioeconomic status than the physician.

The measurement of humor

Empirical research on humor requires effective measurement; past research has presented several approaches. Videotaping or audiotaping medical visits, and coding or rating, have offered the greatest opportunity to systematically capture humor in physician–patient interactions. *Coding* is distinguished from *rating* and involves counting specific occurrences of behavior, inferring what these behaviors mean. Rating allows global judgments of affect and behavioral displays, and reflects the varying opinions of raters; their combined judgments can reveal much about an interaction. Sala and colleagues (2002) developed a coding form to assess humor, and used it to count occurrences of three types of positive humor, negative humor and humor in an 'other' category (similar to the typology of humor in close relationships by de Koning and Weiss (2002)). No *rating scale* exists, however, to assess humor globally or to judge aspects of humor beyond positive versus negative.

Research objectives

The objectives of this research are: (1) to develop a reliable rating scale to assess multiple dimensions of humor in medical interactions; (2) to validate the scale (i.e. content, criterion and construct); and (3) to examine differences in humor for physician–patient interactions with high income versus low income patients.

Method

Development and evaluation of the Physician–Patient Humor Rating Scale (PPHRS) used a subset of audiotaped interactions collected as part of a larger study conducted by the Institute for Health Care Communication. Questionnaire data and independent global ratings of affective communication for physicians and patients collected at baseline in this original study were examined in relation to the humor assessment rating scale in the present study. The larger study and measures are reported in detail elsewhere (Haskard et al., 2008b).

The PPHRS was developed after detailed literature review supporting the scale's content validity. Three psychologists with research expertise in medical communication and three student assistants (two pre-medical and one medical student), developed the scale following careful review of relevant themes in the literature. Initial items were pilot-tested by a medical student and additional student raters, to eliminate redundancies, and to revise and clarify all scale items.

The 46 items of the PPHRS scale include 21 physician-related humor items, 17 patient-related humor items and eight interaction-related humor items (see Table 1). Each is rated on a five-point scale (1 = strongly disagree, 5 = strongly agree). The PPHRS includes approximately equal numbers of positively and negatively worded items in a semi-counterbalanced order to avoid acquiescence response set.

Study procedures

Interaction selection and participant characteristics

The audiotaped interactions rated in this study were a subset of a larger study of 2191 patients in interaction with 156 physicians from primary care specialties. The sites of data collection in 1997–1998 were a west coast university medical center, a Veterans Administration clinic and a health maintenance organization (HMO). Patients joined the study and completed informed consent documents as they waited for their appointments. Medical visits were audio-recorded with patient and physician permission, and both completed a detailed questionnaire (described below) following the visit. Institutional review board approvals were obtained.

Interactions were selected for rating using inclusion criteria: (1) English language, recorded on audiotape, with good quality sound for rating; (2) two patients (highest and lowest income) for each physician; and (3) the patient's completion on the Patient Satisfaction Questionnaire of this item: 'How is the doctor who treated you today at using humor appropriately?' (1 = Poor, 5 = Excellent). Criterion 2 was chosen to assess subtle social power disparities revealed through humor (Seckman & Couch, 1989; Winick, 1976). Criterion 3 allowed assessment of scale validity by comparison with the patients' rating.

Sample

The final sample consisted of 246 physician–patient interactions (i.e. two patients for each of 121 physicians, three for one physician, and one patient for another physician). The patients in the sample included 53.5 percent males with mean age 51 years (SD: 18.81). The majority of the

Table 1. Means, standard deviations, ranges and effective inter-rater reliabilities for individual items (across patients) of the Physician–Patient Humor Rating Scale

Variable	*Mean (SD)*	*Range*	*Effective inter-rater reliability of 6 raters*
The Doctor			
1) The doctor used humor to encourage the patient	2.34 (.83)	1.17–4.67	.75
2) The doctor laughed at the patient	1.57 (.44)	1.00–3.33	.49
3) The doctor used humor to display his/her competence	1.64 (.37)	1.00–3.17	.39
4) The doctor made fun of the patient	1.41 (.33)	1.00–3.00	.46
5) The doctor made the patient laugh	2.38 (.94)	1.17–4.83	.80
6) The doctor used humor that included the patient	2.72 (.77)	1.33–4.83	.73
7) The doctor used a negative emotional tone	1.57 (.38)	1.00–3.50	.52
8) The doctor shared control and power with the patient	3.64 (.45)	2.17–4.67	.48
9) The doctor used humor to 'break the ice'	2.05 (.72)	1.00–4.50	.72
10) The doctor rushed the visit	1.94 (.49)	1.00–4.17	.55
11) The doctor laughed with the patient	2.74 (.88)	1.33–4.83	.79
12) The doctor was appropriate	4.20 (.30)	3.17–5.00	.38
13) The doctor used humor appropriately in informing or educating the patient	2.45 (.44)	1.50–3.83	.50
14) The doctor was mean to the patient	1.40 (.32)	1.00–3.33	.48
15) The doctor deprecated him/herself in a humorous way	1.41 (.28)	1.00–2.50	.18
16) The doctor was sarcastic to the patient	1.34 (.27)	1.00–3.17	.33
17) The doctor used humor to compliment the patient	1.89 (.61)	1.00–4.67	.67
18) The doctor used humor to criticize the health care system	1.41 (.22)	1.00–2.17	.03
19) The doctor tried to be funny	2.11 (.67)	1.17–4.17	.64
20) The doctor used humor to reduce any possible embarrassment	1.82 (.49)	1.17–3.67	.48
21) The doctor encouraged the patient's use of humor	2.70 (.78)	1.50–4.83	.73
The Patient			
1) The patient initiated humor in the encounter	2.31 (.77)	1.17–4.67	.67
2) The patient used humor to criticize the health care system	1.50 (.33)	1.00–3.67	.42
3) The patient encouraged the doctor's use of humor	2.70 (.83)	1.50–5.00	.76
4) The patient used humor at the expense of the doctor	1.40 (.19)	1.00–2.17	.03
5) The patient used a positive emotional tone	3.88 (.50)	2.00–4.83	.70
6) The patient used humor to express dissatisfaction toward the doctor	1.41 (.19)	1.00–2.33	.08
7) The patient disclosed nonmedically related personal information	2.55 (.88)	1.17–5.00	.76
8) The patient seemed obliged to match the doctor's mood	2.36 (.43)	1.33–3.67	.24
9) The patient used humor to encourage the doctor	2.18 (.80)	1.17–4.67	.77
10) The patient used humor to avoid a serious issue	1.60 (.32)	1.17–3.50	.35
11) The patient used humor to cope	2.00 (.63)	1.17–4.00	.53
12) The patient made fun of the doctor	1.37 (.19)	1.00–2.67	.25
13) The patient used humor about his/her health status	2.06 (.69)	1.17–4.00	.61
14) The patient deprecated him/herself in a humorous way	1.59 (.44)	1.00–3.00	.41
15) The patient was mean to the doctor	1.32 (.19)	1.00–2.17	.07
16) The patient tried to be funny	2.19 (.67)	1.00–4.33	.64
17) The patient was sarcastic to the doctor	1.43 (.32)	1.00–3.00	.36
The Interaction			
1) There was trust between the doctor and the patient	4.16 (.36)	3.17–5.00	.60
2) Rapport was established in the interaction	3.99 (.51)	2.33–5.00	.67
3) There was a big power difference between the doctor and the patient	2.71 (.60)	1.17–4.50	.62

(continued)

Table 1. (Continued)

Variable	*Mean (SD)*	*Range*	*Effective inter-rater reliability of 6 raters*
4) There was an equal amount of humor used by the doctor and the patient	2.64 (.84)	1.00–5.00	.68
5) The usage of humor was done in the spirit of mutual respect	4.00 (.66)	2.00–5.00	.55
6) Timing of the humor usage was bad	1.96 (.68)	1.00–4.00	.30
7) Humor helped the mood of the interaction	3.72 (.70)	1.50–5.00	.50
8) The patient used more humor than the doctor	2.70 (1.19)	1.00–5.00	.82

patients (46.1%) were married; 33.7 percent were employed full time, 21.8 percent were unemployed and 20.6 percent retired (the remainder were employed part time or students). The ethnicities of patients were 66.3 percent Caucasian, 17.5 percent Hispanic/Latino, 4.9 percent African American, 6.1 percent Asian American, 2.8 percent Native American and 2.4 percent other; 31.3 percent of the patients completed some college. The majority of patients (68.5%) had some kind of insurance including Medicare, Medicaid, Veterans, HMO or preferred provider organization (PPO).

Rating procedures The final scale was rated by six trained raters who each assessed all 246 interactions using a unique randomly ordered list to prevent practice and fatigue effects. Raters were trained in the process and terminology of the scale; they had no prior knowledge about physicians' or patients' characteristics, or questionnaire data from the original study.

Validity measures

To assess the validity of the PPHRS, it was correlated with composite variables from questionnaires completed by physicians and patients and with global affect ratings, including:

Patient Satisfaction Questionnaire (PSQ) Patients rated their satisfaction with the physician and quality of care, on a 65-item post-visit questionnaire which included demographic information and satisfaction items from the RAND PSQ-18 (Marshall & Hays, 1994) (utilizing five-point Likert scales; e.g. 1 = strongly disagree to 5 = strongly agree; or 1 = poor to 5 = excellent). The subscales, their included items and Cronbach's alphas are listed in Table 2. Patients also reported on a five-point scale (1 = poor to 5 = excellent): 'How is the doctor at using humor appropriately?' and patient income was assessed by patients' responses to the question 'What was your approximate family income from all sources, before taxes in 1996?' on a 1–11 scale with 1 (less than $10,000) to 11 (over $100,000).

Doctor Satisfaction Questionnaire (DSQ) Physician satisfaction with the medical visit was surveyed with a 20-item scale (Cronbach's alpha = .86) (Suchman, Roter, Green, & Lipkin, 1993).

Physician–Patient Global Rating Scale (GRS) The 14-item Physician–Patient Global Rating Scale (GRS) developed using methods discussed in Rosenthal (1982) and described in Haskard et al. (2008b) was used to rate global affect of the physician. Ratings were done by two sets of multiple raters from two sites (data collection and analysis site); their ratings were transformed to *Z* scores prior to analyses to account for differences in scale usage by different raters. *Z*-scored ratings were aggregated into subscales; included items and Cronbach's alphas are listed in Table 2.

Data analysis

Characteristics of the participants in the sample (means, standard deviations, percentages) were computed, as were characteristics of the scales. Effective inter-rater reliabilities were calculated and based on the results, scores from the six raters were averaged for each individual item. The items were then subjected to principal components analysis with varimax orthogonal rotation to determine component subscales. Several forms of validity were assessed. *Construct validity* assessed whether the PPHRS subscales correlated with the communication rating subscales of another measure (Physician–Patient GRS) with which it should, theoretically, be correlated. *Criterion validity,* specifically *predictive validity* (whether the PPHRS correlated with or predicted future outcomes) was tested by correlating PPHRS

Table 2. PSQ, GRS and PPHRS subscales, subscale alphas and included items

Scale *Subscale*	*Inter-item reliability (alpha) of subscale*	*Items*
PSQ		
Physician Information Giving	.95	Physician told you everything, physician let you know test results, physician explained treatment alternatives, physician explained side-effects of medications and physician told you what to expect
Patient Perceived Decision Making	.74	Physician asked you to take responsibility for your treatment, physician asked you to help make decisions, and physician gives you some control over treatment decisions
Patient Choice	.96	Physician offers you choices in your medical care, physician discusses the pros and cons of each choice with you, physician asks your opinion or preference and physician takes your preferences into account when making decisions
Patient Perceptions of Overall Communication	.96	Physician's personal manner, physician's communication skills, physician's technical skills, physician's overall care and quality of care
GRS		
Physician Affective Communication	.95	Physician was informative, shared control and power with patient, invited patient to share their understanding, and to participate in decision making and was empathic with the patient
Patient Involvement	.89	The patient took initiative and introduced the agenda, asked the doctor questions, was an active participant in discussion, understood what to do or was able to get clarification
Physician–patient Collaboration	.62	This was a collaborative relationship with a two-way conversation, and involved discussions of prevention and health promotion
PPHRS		
Physician Positive Humor[a]	.96	Physician items 1, 2, 3, 5, 6, 9, 11, 12, 13, 15, 17, 18, 19, 20, 21
Physician Negative Humor[b]	.70	Physician items 4, 7, 8(rev), 10, 14, 16
Patient Positive Humor	.92	Patient items 1, 3, 5, 7, 8(rev), 9, 10, 11, 13, 14, 16
Patient Negative Humor[c]	.76	Patient items 2, 4, 6, 12, 15, 17
Mutual Trust	.90	Interaction items 1, 2, 3(rev), 5, 6(rev), 7
Patient Dominance of Humor[c]	.59	Interaction items 4(rev), 8

Notes: PSQ = Patient Satisfaction Questionnaire; GRS = Physician–Patient Global Rating Scale; PPHRS = Physician–Patient Humor Rating Scale; rev = reversed

[a] We recommend removal of the following low reliability individual items from this subscale in future research: 3, 12, 15 and 18

[b] These subscales include mostly non-reverse coded items because the items are already worded in a negative direction and the subscales reflect negative behavior

[c] Due to reliability and validity concerns, we recommend that readers not use these subscales in future research

subscales with a patient-reported item regarding the physician's appropriate use of humor, and by computing correlations of the PPHRS subscales with the PSQ subscales and the DSQ total, demonstrating how aspects of humor used could predict patients' and physicians' visit satisfaction. Correlations were calculated with physician as unit of analysis, averaged across the two patients per physician, allowing a robust, stringent and highly generalizable test of the validity hypotheses. Paired samples *t*-tests were used to compare the high and low income patients for each physician on the PPHRS subscales.

Results

Characteristics of the scale

Table 1 displays each item, mean, standard deviation, range and effective inter-rater reliability for each item of the PPHRS. The mean effective inter-rater reliability coefficient was .51 (SD = .22), which is appropriate reliability for individual items that are then grouped into subscales for validity analyses (see later) (Rosenthal, 1966, 1982). Scores of the six raters were averaged to form an overall score for each item.

Principal components analysis

Based on principal components analyses with varimax orthogonal rotation, six component subscales for all analyses of the PPHRS were created by averaging individual items within each subscale. These subscales were named Physician Positive Humor, Physician Negative Humor, Patient Positive Humor, Patient Negative Humor, Mutual Trust and Patient Dominance of Humor. Cronbach's alpha scale reliabilities and individual items are listed in Table 2. Inter-correlations of PPHRS subscales are shown in Table 3. The reliabilities of two of the subscales (Patient Dominance of Humor and Patient Negative Humor) are low, although we do present analyses with these scales to demonstrate whether there are patterns of validity.

Assessment of validity

Construct validity The PPHRS subscales were correlated with the three subscales of the Physician–Patient GRS (see Table 3). GRS—Physician Effective Communication was correlated positively with Physician Positive Humor, Patient Positive Humor and Mutual Trust, and negatively with Physician Negative Humor. GRS—Patient Involvement was correlated positively with Patient Positive Humor and Mutual Trust and negatively with Physician Negative Humor. The correlations of GRS—Physician–patient Collaboration with Mutual Trust, and Physician and Patient Positive Humor

Table 3. Correlations of PPHRS subscales with GRS, PSQ and DSQ subscales and inter-correlations of PPHRS subscales with each other

	PPHRS subscales					
Dominance	*Physician Positive Humor*	*Physician Negative Humor*	*Patient Positive Humor*	*Patient Negative Humor*	*Mutual Trust*	*Patient of Humor*
GRS: Physician Effective Communication	.35**	–.32**	.31**	.01	.37**	–.16±
GRS: Patient Involvement	.16±	–.29**	.21*	.16±	.23*	–.11
GRS: Physician–Patient Collaboration	.25**	–.31**	.27**	.15	.31**	–.07
PSQ: Patients' Ratings of their Physicians' Appropriate Use of Humor	.31**	–.06	.18*	–.03	.19*	–.14
PSQ: Patient Perceived Decision Making	.23*	–.11	.19*	–.04	.23*	.00
PSQ: Patient Choice	.22*	–.14	.20*	–.08	.20*	.00
PSQ: Doctor Information Giving	.22*	.05	.19*	.02	.12	–.06
PSQ: Patient Perceptions of Overall Communication	.25**	–.06	.21*	.00	.24**	–.02
DSQ: Overall Doctor Satisfaction	.11	–.02	.06	–.24**	.06	–.04
Physician Positive Humor	–	–.33**	.83**	.00	.73**	–.18*
Physician Negative Humor	–	–	–.41**	.19*	–.63**	.02
Patient Positive Humor	–	–	–	.10	.80**	.17
Patient Negative Humor	–	–	–	–	–.10	.18*
Mutual Trust	–	–	–	–	–	.12
Patient Dominance of Humor	–	–	–	–	–	–

Notes: GRS = Physician–Patient Global Rating Scale; PSQ = Patient Satisfaction Questionnaire; DSQ = Doctor Satisfaction Scale. Physician-level ($N = 121$) analyses are random effects analyses based on mean scores at the physician level. Less robust fixed effects analyses were also done at the patient level ($N = 246$), and showed substantially the same patterns as here, but are less generalizable

were significant and positive; GRS—Physician–patient Collaboration correlates negatively with Physician Negative Humor. Of 18 correlations, 11 (61%) were significant, making it unlikely that these occurred by chance.

Predictive validity—Method I Patients' rating of physicians' appropriate use of humor (see Table 3) correlated significantly with three of the PPHRS subscales: Physician Positive Humor, Patient Positive Humor and Mutual Trust, and not with: Physician Negative Humor, Patient Negative Humor and Patient Dominance of Humor (thus, 50 percent of the correlations were significant).

Predictive validity—Method II Table 3 shows that Physician Positive Humor and Patient Positive Humor were significantly correlated with: patient perceptions of decision making, patient choice, doctors' information giving and patient perceptions of overall communication. Patient Negative Humor was negatively correlated with overall physician satisfaction. Mutual Trust was positively correlated with patient perceived decision making, patient choice and patient perceptions of overall communication. Of 30 correlations, 12 (40%) were significant.

Comparison of humor in interactions with high and low income patients Paired samples *t*-tests compared PPHRS scale composites for high income versus low income patients. Low income patients had average household income (1996 dollars) in the $19,999 or less category; high income patients had average household income in the $50,000 – $59,999 category. Findings are presented in Table 4. For the PPHRS composites, Mutual Trust was significantly higher when physicians interacted with their high income compared with their low income patients. There was also a trend ($p < .10$) for physicians to use more Negative Humor with their low (compared to high) income patients and for high income patients to use more Positive Humor. Across the six subscales taken together, high income patients received and displayed more positive and less negative humor, were more dominant and displayed greater physician–patient trust than low income patients ($t(5) = 6.14$, $p = .001$).

Discussion

The Physician–Patient Humor Rating Scale (PPHRS) is the first rating scale to measure humor in exchanges between physicians and patients; it

Table 4. Means for paired sample *t*-tests comparing high and low income patients

		High income		*Low income*	
Subscales[a]	*t-test comparing high and low income patients*	*M*	*SD*	*M*	*SD*
Physician Positive Humor	t (120) = 1.09, p = .278, r = .10	2.26	.48	2.20	.50
Physician Negative Humor	t (120) = –1.79, p = .077, r = .16	1.64	.25	1.69	.23
Patient Positive Humor	t (120) = 1.85, p = .066, r = .17	2.49	.48	2.38	.50
Patient Negative Humor	t (120) = –1.32, p = .188, r = .12	1.39	.16	1.42	.16
Mutual Trust	t (120) = 2.34, p = .021, r = .21	3.93	.46	3.81	.51
Patient Dominance of Humor	t (120) = .64, p = .525, r = .64	3.05	.81	2.99	.90

Notes: Because of a miscoding, one physician could not be included because he interviewed only one patient and another could not be included because she interviewed three patients. Thus, a total of 121 physicians interviewed two patients each

In the *t*-tests presented, a negative *t* means that patients with low income have higher scores on the dependent variable than do patients with high income. A positive *t* means that scores on the dependent variable are higher for high income patients

[a]A meta-analytic approach using a random effects test was used to combine the six subscale *t*-tests. Each of the six effects is positive such that, as predicted, high SES patients received more positive humor and less negative humor from the doctor, there was greater mutual trust, the patient displayed more positive humor and less negative humor and patient dominance of humor was higher. The combined one sample, random effects test (t (5) = 6.14, p = .001) is significant, representing a suggestive positive finding

is reliable and shows evidence of several forms of validity. This 46-item scale consists of four subscales (average internal-consistency reliability .87) that are generally conceptually valid and reflect categories of humor usage suggested in past research (Sala et al., 2002). Two subscales reported in the results—Patient Negative Humor and Patient Dominance of Humor—did not demonstrate the same level of reliability and validity as the other subscales so while the results are reported here for informational purposes so that readers can see all that was done, they are not recommended for use by future investigators.

Positive physician GRS ratings correlated positively with physicians' positive humor and negatively with physicians' negative humor, supporting the validity of the PPHRS. Patients' ratings of their physicians' appropriate use of humor correlated positively with positive PPHRS-rated humor by both physicians and patients and with assessments of mutual trust in their interaction, and the PPHRS predicted patient satisfaction. The only significant negative correlation with physician satisfaction with the visit was the patient's use of negative humor.

With their higher income patients, physicians were rated as having greater mutual trust and findings approaching significance suggested that physicians used more negative humor with low income patients and higher income patients were rated as using more positive humor. Furthermore, the overall combination of the six subscale *t*-tests produced a modest positive finding. Such differences are particularly noteworthy because raters did not know the income levels of the patients they rated. Such differences are subtle, and provide some preliminary evidence of 'micro-inequities' in communication toward low income patients during the medical visit. The preliminary findings here suggest that income-related social disparities in communication should be pursued in future research using this and other assessment instruments.

Strengths, limitations and future research

This study focused on humor, an understudied aspect of physician–patient communication, and included a large sample of physicians, each with one high and one low income patient. The balanced design allowed both patient- and physician-level analyses, and assessment of several types of scale validity. This study involved primary care, potentially limiting generalizability of findings to other medical contexts (although 58.9 percent of care in the USA is primary) (Hing, Cherry, & Woodwell, 2006). Visual nonverbal communication (e.g. gestures, facial expressions) was not studied here, although much affect is communicated vocally (Haskard, Williams, DiMatteo, Heritage, & Rosenthal, 2008a). Participants' humor may have been altered by being recorded, although with audiotaping this is unlikely (Byrne & Long, 1989).

The PPHRS can be used to analyze communication in audiotape or videotape recordings, or transcripts of physician–patient interactions. It would be useful to design studies to facilitate examination of temporal components of humor by physicians and patients, assessing how behavior of one affects the other. The relationship of humor to patient and physician characteristics such as gender, age and ethnicity should be studied, and the PPHRS should be used with populations of patients in specialty care with more serious illnesses as well as patients of varying psychological status levels. Future work should also focus on humor in relation to other patient outcomes such as adherence or health, pain and symptoms (Seaward, 1992), as well as the effects on humor usage of training patients and physicians in effective communication skills.

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