Communication that values patient autonomy is associated with satisfaction with care: a systematic review

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Question: Which communication factors used by clinicians during patient-clinician interactions are associated with satisfaction with care? **Design**: Systematic review with meta-analysis of studies investigating the association of verbal or nonverbal factors or interaction styles used by clinicians with patient satisfaction during an encounter between clinician and patient. **Participants**: Clinicians interacting with patients in primary care or rehabilitation settings. **Results**: Twenty-seven studies investigated 129 verbal, nonverbal, and interaction style factors. Of these, 38 factors were consistently associated with satisfaction. Verbal factors concerning clinicians involving, facilitating, and supporting patients were associated with satisfaction with care. Most communication factors presented a fair correlation ($r \geq 0.21$ but < 0.41) with satisfaction with care. Nonverbal factors such as time spent discussing prevention and time spent reading patient charts had a fair association with satisfaction with care (correlations range from 0.21 to 0.40). A moderate association was found between interaction styles such as caring (pooled $r = 0.51$, 95% CI 0.42 to 0.60) and satisfaction with care. Over half (58%) of the 129 identified factors never associated with satisfaction with care and the remainder associated inconsistently. **Conclusion**: The number of potential modifiable communication factors associated with satisfaction with care and the magnitude of their association partially support interventions to train clinicians in communication skills that value patient autonomy. **[Oliveira VC, Refshauge KM, Ferreira ML, Pinto RZ, Beckenkamp PR, Negrao Filho RF, Ferreira PH (2012) Communication that values patient autonomy is associated with satisfaction with care: a systematic review. *Journal of Physiotherapy* 58: 215–229]**

Key words: Communication, Systematic review, Professional-patient relations, Patient satisfaction

Introduction

Patient satisfaction with health care, including physiotherapy, has been specified as related to three elements: quality of the interaction with a clinician, quality of treatment approach used, and happiness with clinical outcomes after treatment (Casserley-Feeney et al 2008, May 2000, Small et al 2011). Patient satisfaction has been considered as an outcome since the World Health Organization included physical, social, and psychological well-being in the definition of health (WHO 1946). The rationale is that higher levels of satisfaction with care may help patients to comply with their rehabilitation programs (Ware et al 1983). Satisfied patients re-attend four times more frequently for treatment than those reporting poor satisfaction (Rubin et al 1993) and have higher levels of compliance in rehabilitation programs (Hirsh et al 2005, Small et al 2011). Chronic conditions are frequently managed in physiotherapy, and patient compliance to long-term interventions is essential to effective clinical practice (May 2000, WHO 2003).

Studies investigating satisfaction in primary care and rehabilitation settings, including physiotherapy (Sheppard et al 2010), have shown positive associations with clinical outcomes. For example, satisfaction correlated with symptom relief in musculoskeletal conditions ($r = 0.51$) (Hirsh et al 2005). In a weight loss trial, one point higher satisfaction on a 9-point scale was associated with 0.20 kg greater weight loss per month (Finch et al 2005). The patient-clinician interaction has been consistently reported as a critical aspect affecting patient satisfaction with health care (Hirsh et al 2005, May 2000, Sheppard et al 2010). A previous review (Hall et al 1988) showed associations between specific communication factors used by clinicians interacting with patients and satisfaction with care, although the evidence is now old and did not include physiotherapy settings.

Communication used by clinicians during their interaction with patients varies along a continuum from patient's autonomy to clinician's paternalism (Abdel-Tawab and Roter 2002). Communication factors aligned with clinician

> **What is already known on this topic**: Patient satisfaction with health care, including physiotherapy, is related to the quality of the interaction with the clinician, the quality of the treatment approach used, and happiness with clinical outcomes after treatment.
>
> **What this study adds**: Many communication factors are also consistently associated with patients' ratings of satisfaction with care. Factors such as increasing the length of the consultation and showing interest in the patient and caring could be used by physiotherapists to improve patient satisfaction with physiotherapy management.

paternalism indicate that dominant clinicians determine the best course of action for the patient whereas the opposite extreme reflects high value attributed to patient autonomy (Abdel-Tawab and Roter 2002). Contemporary shared decision-making and patient-centred care approaches stand between these two extremes, where clinicians convey technical expertise and assist their patients to interpret and understand their own values more fully, working as partners to reach a mutual decision (Abdel-Tawab and Roter 2002). Communication factors used during patient-centred care and shared decision-making approaches are more dynamic in nature, with clinicians and patients expressing their needs, concerns, and preferences (Abdel-Tawab and Roter 2002). Although these interactions appear attractive their usefulness is not universally supported in the literature. An argument against interactions valuing patient autonomy is the hierarchical nature of societies in which patients expect a dominant clinician and they may be disappointed if clinicians act otherwise (Abdel-Tawab and Roter 2002). Additionally the limited health care resources available to deal with high patient volume raises concern that this interaction may overwhelm the health care system with demands that are too time-consuming (Abdel-Tawab and Roter 2002). Despite these arguments, interactions valuing patient autonomy such as patient-centred care and shared decision-making have been considered effective for improving patient satisfaction with care (Abdel-Tawab and Roter 2002, Beck et al 2002, Hall et al 1988).

Previous reviews have investigated the association between patient satisfaction with care and communication factors using these patient-centred care and shared decision-making approaches in primary care and rehabilitation settings (Beck et al 2002, Hall et al 1988). However, the magnitude of the association between communication factors and satisfaction is not usually reported (Beck et al 2002, Hall et al 1988) and this prevents the quantitative identification and ranking of potentially modifiable communication factors supporting interactions valuing patient autonomy. Of note, randomised controlled trials and systematic reviews investigating the effectiveness of theory-based training of communication skills (eg, patient-centred care and shared decision-making) reported no effect on clinical outcomes such as satisfaction with care and health status (Brown et al 1999, Edwards et al 2004, Uitterhoeve et al 2010). It is likely that the identification of modifiable factors that are correlated with satisfaction could potentially form the basis for evidence-based interventions for communication skills training, and inform the design of future randomised controlled trials. Moreover, there is a need for these reviews to be updated as additional observational studies (Daaleman and Mueller 2004, Gilbert and Hayes 2009, Graugaard et al 2005, Haskard et al 2009) investigating communication factors have been published since the last systematic review was conducted.

The specific research question for this study was:

Which specific communication factors are associated with satisfaction with care in primary care and rehabilitation settings?

Method

Identification and selection of studies

Studies were identified in MEDLINE, PsycINFO, Embase, CINAHL, AMED, LILACS and Cochrane databases, using optimised search strategies conducted from earliest record to 29 May 2011 (see Appendix 1 on the eAddenda for the full search strategy).

Study design: To be included, studies had to investigate the association between communication factors (verbal factors, nonverbal factors, or interaction styles) and constructs of the therapeutic alliance (collaboration, affective bond, agreement, trust, or empathy), measured during encounters between health practitioners and patients.

Settings and participants: To be included, studies had to investigate any interaction between patients and clinicians (eg, physicians, nurses, physiotherapists) in primary care or rehabilitation settings (Box 1). Studies on mental illness were excluded because the nature of care and consultation may demand different interactions.

Verbal, nonverbal, and interaction style factors used by clinicians: Studies were eligible if they investigated, during an interaction between clinicians and patients, the association of any verbal, nonverbal, and/or interaction style factors used by clinicians with a satisfaction outcome. Verbal factors consisted of speech content used between clinicians and patients, eg, *psychosocial talk*, defined as statements of empathy, reassurance and information involving aspects of social and psychological behaviour (Hall et al 1994). Nonverbal factors were defined as communication behaviour without speech content, eg, facial expression, body movement, tone of voice and interaction physical distance (Haskard et al 2009). Interaction styles incorporate aspects of both verbal and nonverbal factors and include features such as affective connection and openness to patients, sharing of control and negotiation of options (Flocke et al 2002).

There was no restriction to coding systems used by studies to categorise: verbal, nonverbal, and/or interaction style factors, eg, Roter Interaction Analysis System and Bales Process Analysis System (Oths 1994, Smith et al 1981); method of observation, eg, observed encounters, videotapes or audiotapes; or coders, eg, neutral observers, clinicians or patients. Studies that included actors or simulated patients were excluded.

Satisfaction with care: Studies were included if they investigated the association of verbal, nonverbal, and/or

Box 1. Inclusion criteria.

Design
- Longitudinal studies and cross-sectional studies
- All studies investigating association of any verbal, non-verbal and/or interaction style factors used by clinicians with patient satisfaction during an interaction between clinicians and patients

Participants
- Clinicians interacting with patients in primary care or rehabilitation settings
- Patients without mental illness

Outcome measures
- Association between communication factors and patient satisfaction, including: satisfaction with the consultation; satisfaction with the treatment approach used by clinicians; or satisfaction with the clinical outcomes after treatment

interaction style factors with at least one of the following patient satisfaction outcomes:

1. Satisfaction with the consultation;
2. Satisfaction with the treatment approach used by clinicians;
3. Satisfaction with the clinical outcomes after treatment.

Satisfaction needed to be reported by patients and there was no restriction on the tools employed to rate it.

All studies identified by the search strategy were screened using the eligibility criteria outlined above.

Assessment of characteristics of studies

Studies meeting the eligibility criteria were assessed for methodological quality using a 7-item checklist based on the STROBE guidelines (Pengel et al 2003): use of a representative sample, having a defined sample, use of blinding, having a follow-up rate greater than 85%, appropriate choice of outcome measures, reporting outcome data at follow-up, and control for confounding via statistical adjustment. Screening for eligible studies, methodological quality assessment, and data extraction were conducted independently by two assessors with disagreement resolved by discussion.

Data analysis

Data extracted from each study included: descriptive data on gender, sample size, age, and source of participants (ie, patients and clinicians); verbal, nonverbal and/or interaction style factors; and the association estimates (eg, correlation value) between communication factors and satisfaction with care.

Correlations between communication factors and satisfaction that were reported as Pearson's r, Spearman's rho or Point-biserial correlation were grouped as verbal, nonverbal and interaction style factors. Meta-analysis was carried out for homogeneous constructs. Pooled analyses were performed using random-effects for trials presenting an I^2 of 50% or more (Higgins et al 2003). Correlation values were reported on a common –1 to 1 point scale with 95% CIs. Analytic software[a] was used to conduct all analyses. Correlations were considered poor for values < 0.21, fair for values ≥ 0.21 but < 0.41, moderate for values ≥ 0.41 but < 0.61, substantial for values ≥ 0.61 but < 0.81, and high for values ≥ 0.81 (Landis and Koch 1977). Individual communication factors that could not be pooled were presented separately.

Factors used by clinicians were categorised by two assessors using the Verona medical interview classification, which is based on clinician interview performance considering its main functions and the corresponding patient/clinician-centred interview techniques (Del Piccolo et al 2002). Disagreements were resolved by discussion. This categorisation allowed data synthesis, given that different studies employed different systems to code communication factors (Zimmermann et al 2011, Zimmermann et al 2007). The Verona medical interview classification (Del Piccolo et al 2002) categorises clinician responses during the interaction as: *information gathering* (ie, closed and open questions used by clinicians), *patient facilitating* (ie, clinicians using facilitators, transitions, and conversation), *patient involving* (ie, clinicians asking for information and checking for clarification), *patient supporting* (ie, responses of clinicians supporting, agreeing, or reassuring), and *patient education* (ie, clinicians informing about the condition or psychosocial issues).

Results

Flow of studies through the review

The database searches yielded a total of 3414 titles, of which 27 studies in 28 publications were included in the review (Figure 1). The included studies reported on 129 communication factors between 7981 patients and their clinicians (Bensing 1991, Cecil and Killeen 1997, Comstock et al 1982, Daaleman and Mueller 2004, DiMatteo et al 1979, Dimatteo and Taranta 1979, DiMatteo et al 1980, Duggan and Parrott 2000, Flocke et al 2002, Gilbert and Hayes 2009, Gordon et al 2000, Graugaard et al 2005, Greene et al 1994, Hall et al 1994, Hall et al 1981, Haskard et al 2009, Hunfeld et al 1999, Koss and Rosenthal 1997, Larsen and Smith 1981, Mead et al 2002, Oths 1994, Paasche-Orlow and Roter 2003, Pereira and Azevedo 2005, Putnam et al 1985, Rowland-Morin and Carroll 1990, Smith et al 1981, Stiles et al 1979, Street and Buller 1987).

Characteristics of the included studies

Of the included studies, 24 used cross-sectional and 3 used longitudinal designs (Table 1). The most commonly investigated clinicians were physicians (n = 24 studies) and included studies used videotape, audiotape, observation and surveys to collect information on verbal, nonverbal and/or interaction style factors (Table 1). The studies also used a variety of tools to code both communication factors and satisfaction. The most frequently used tool was the Roter Interactional Analysis System used in 8 studies (Gilbert and Hayes 2009, Gordon et al 2000, Graugaard et al 2005, Hall et al 1994 studies I and II, Hall et al 1981, Mead et al 2002, Paasche-Orlow and Roter 2003).

Quality: The most common methodological flaw of included studies was lack of appropriate statistical adjustment for confounding factors. In general, included studies also failed to report whether the coder was aware of prognostic factors at the time of outcome assessment (Table 2).
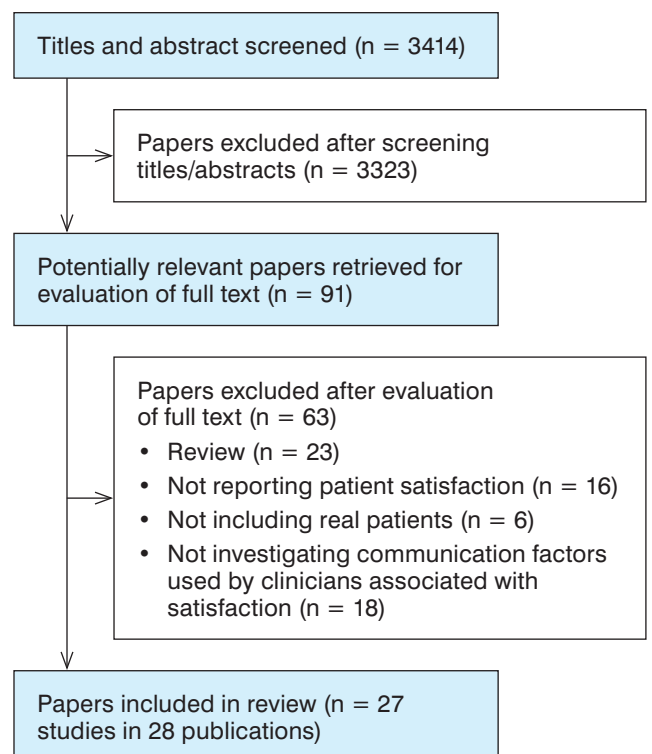

Figure 1. Flow of studies through the review.

Table 1. Description of included studies.

Study Design	Patients Sample size (n) Gender(%), Age (years)	Setting Clinicians	Communication factors Tool Coder	Patient satisfaction tool
Bensing 1991 CS	n = 103 66% female, 62% over 64 y	Hypertension consultation, Netherlands Physician: n = 27	Verbal/nonverbal Videotape: Netherlands system Coder: Observer	6-item scale
Cecil & Killeen 1997 CS	n = 50 70% female, mean 37 y (range 18–81)	Family practice clinic Physician: n = 15, 27% female	Verbal Videotape: Relational Communication Control Coding Scheme Coder: Observer	2-item scale
Comstock et al 1982 CS	n = 150 71% female, mean 57 y	Outpatient clinic, New Mexico, USA Physician: n = 15, 27% female, mean 30 y	Verbal/nonverbal One-way mirror observation: 30-item checklist Coder: Observer	8-item questionnaire
Daaleman et al 2004 CS	n = 105 68% female, mean 43 y (SD = 16.9)	Outpatient medicine clinic, Kansas, USA Physician	Verbal 22-item self-administered survey Coder: Patient	5-item Visit Rating Questionnaire
DiMatteo et al 1980, 1979, 1979 CS	n = 462 46% female, mean 52 y	Community teaching hospital, New York, USA Physician: n = 71, 27% female, mean 31 y	Nonverbal Audiotape/videotape: PONS test and intentional encoding skills Coder: Observer	2-item scale (Art of Care)
Duggan et al 2001 LO	n = 34 53% female, NA	Medical teaching school Physician: n = 12, 33% female	Nonverbal Videotape: Checklist Coder: Observer	14-item affective satisfaction
Flocke et al 2002 CS	n = 4454 62% female, mean 42 y	Primary care outpatient visits, Ohio, USA Physician: n = 138, 26% female, mean 43y	Style Observation: Checklist Coder: Observer	4-item form from MOS 9 visit rating
Gilbert et al 2009 LO	n = 155 67% female, mean 75.4 y (SD = 7.4)	New England state Nurse: n = 31, 100% female, mean 48.2 y (SD = 7.2)	Verbal/nonverbal/style Videotape: RIAS and checklist Coder: Observer	One-item Consumer Assessment of Health Care Providers Quality
Gordon et al 2000 CS	n = 216 0% female, mean 62 y (range 26–78)	General medicine clinic, Portland, USA Physician: n = 43, 35% female	Verbal Audiotape: RIAS and uncertainty expressions frequency Coder: Observer	26-item American Board of Internal Medicine Questionnaire

Table 1. Description of included studies – contd.

Study Design	Patients Sample size (n) Gender(%), Age (years)	Setting Clinicians	Communication factors Tool Coder	Patient satisfaction tool
Graugaard et al 2005 LO	n = 44 39% female, median 57 y (range 26–75)	Outpatient clinic at Norwegian University hospital Physician: n = 12, 25% female	Verbal Audiotape: RIAS Coder: Observer	11-item Norwegian questionnaire
Greene et al 1994 CS	n = 81 79% female, mean 72 y	General medicine practice, New York, USA Physician: n = 18; 50% female, mean 39.7 y (range 29–50)	Verbal/nonverbal Audiotape: Multidimensional Interaction Analysis scoring Coder: Observer	14-item scale
Hall et al 1981 CS	n = 50 78% female, mean 43 y	Community health outpatient centre, East Baltimore, USA Physician: n = 2	Verbal/nonverbal Audiotape: Modified RIAS Coder: Observer	Satisfaction scale
Hall et al 1994 CS	Study I: n = 97 gender = NA, mean 62 y	Ambulatory Care centre, Massachusetts, USA Physician: n = 50, 50% female, 58% 32–64 y	Verbal/nonverbal Videotape: RIAS and speech and Voice tone Coder: Observer	15-item questionnaire
	Study II: n = 524 58% female, mean 60 y	Community and hospitals in Canada and USA Physician: n = 127, 21% female, mean 34 y	Verbal/nonverbal Audiotape: RIAS and Checklist Coder: Observer	43-item questionnaire
Haskard et al 2009 CS	n = 235 63% female, mean 45.3 y (SD = 16.8)	Primary care medical practices, Southern California, USA Nurse: n = 81, 95% female	Style Videotape: Affective and task-oriented communication scale Coder: Observer	12-item questionnaire (interpersonal satisfaction)
Hunfeld et al 1999 CS	n = 24 100% female, median 31.4 y (range 21–43)	Hospital division of obstetrics and prenatal diagnosis for a fetal anomaly, Rotterdam, Netherlands Physician: n = 6, 67% female, mean 41.2 y (range 32–58)	Nonverbal Questionnaire: Counsellor Rating Form and videotape: Global Affective Measure Coder: Patient and observer	10-item scale
Koss et al 1997 CS	n = 48 50% female, mean 60 y	Eastern teaching hospital, USA Physician: n = 24, 50% female	Nonverbal Videotape: 9-point scale Coder: Observer	30-item questionnaire
Larsen et al 1981 CS	n = 34 74% female, mean 36.2 y (range 21–74)	Family medical centre, Washington, USA Physician: n = 15, 33% female	Nonverbal Videotape: Mehrabian's Classification Coder: Observer	6-item questionnaire

Table 1. Description of included studies – contd.

Study Design	Patients Sample size (n) Gender(%), Age (years)	Setting Clinicians	Communication factors Tool Coder	Patient satisfaction tool
Mead et al 2002 CS	n = 173 54% female, mean 47.9 y (SD = 17.1)	Nine practice centres, UK Physician: n = 14	Verbal/nonverbal Videotape: RIAS and 2-nonverbal checklist Coder: Observer	18-item Consultation rating questionnaire
Oths 1994 CS	n = 57 53% female, mean 42 y (range 14–80)	Outpatient chiropractic clinic, Cleveland, USA Chiropractor: n = 1, male	Verbal/nonverbal Audiotape: Bales Process Analysis Observation: checklist Coder: Observer	16-item Ware questionnaire
Paasche-Orlow et al 2003 CS	n = 564 63% female, mean 49.3 y	Community practice, Baltimore, USA Physician: n = 59, 10.2% female, mean 40.7 y (SD = 6.5)	Verbal Audiotape: RIAS Coder: Observer	16-item questionnaire
Pereira et al 2005 CS	n = 50 46% female, range 18–50 y	Hospital Estadual inpatients, Acre, Brazil Physician	Style Questionnaire Coder: Patient	Questionnaire
Putnam et al 1985 CS	n = 102 100% female, mean 33.5 y (SD = 11.9)	Medicine walk-in clinic, North Carolina, USA Physician: n = 14, 21.4% female	Verbal Audiotape: Verbal Response Mode Coder: Observer	21-item questionnaire (affective satisfaction)
Rowland-Morin et al 1990 CS	n = 52 gender = NA, range 22–82 y	Academic primary-care hospitals Physician: n = 5, 100% male	Verbal/nonverbal Audiotape: Computerised Language Analysis Coder: Observer	29-item Medical Interview Scale
Smith et al 1981 CS	n = 29, 69% female, range 18–72 y	Family medical centre, Washington, USA Physician: n = 11	Verbal/nonverbal Videotape: Bales Process Analysis Coder: Observer	7-item questionnaire
Stiles et al 1979 CS	n=50, 64% female, range 16-75 y	General medicine, North Carolina, USA Physician: n = 19	Verbal Audiotape: Stiles Coding Coder: Observer	33-item questionnaire (affective satisfaction)
Street et al 1987 CS	n = 38 47% female, mean 35.6 y (range 17–72)	Family practice clinic, South-western, USA Physician: n = 10, 10% female, range 28–35 y	Verbal/nonverbal/style Videotape: SPECO program and questionnaire Norton's Communication Coder: Patient and observer	6-item Buller and Buller's measure

CS: cross-sectional, LO: longitudinal observational, NA: not available, RIAS: Roter Interactional Analysis System; PONS test: Profile of Nonverbal Sensitivity

Table 2. Quality of included studies (7-item checklist based on the STROBE guidelines).

Study (n=27)	Use of a representative sample	Having a defined sample	Use of blinding		Follow-up rate > 85%	Appropriate choice of outcomes measures	Reporting outcome data at follow-up	Control for confounding via statistical adjustment	Total (0 to 7)
			Communication factors	Satisfaction					
Bensing 1991	Y	Y	O	P	NA	Y	N	N	4
Cecil et al 1997	Y	Y	O	P	NA	Y	N	N	4
Comstock et al 1982	Y	N	O	P	NA	Y	Y	N	4
Daaleman et al 2004	Y	Y	P	P	NA	Y	Y	N	5
DiMatteo et al 1980, 1979,1979	Y	N	O	P	NA	Y	Y	N	4
Duggan et al 2001	Y	N	O	P	Y	Y	Y	N	4
Flocke et al 2002	Y	Y	O	P	NA	Y	Y	N	5
Gilbert et al 2009	Y	Y	O	P	Y	Y	Y	N	5
Gordon et al 2000	Y	Y	O	P	NA	Y	Y	N	5
Graugaard et al 2005	Y	Y	O	P	N	Y	Y	Y	5
Greene et al 1994	Y	Y	O	P	NA	Y	Y	N	5
Hall et al 1981	Y	Y	O	P	NA	Y	Y	N	5
Hall et al 1994 Study I	Y	Y	O	P	NA	Y	Y	Y	6
Hall et al 1994 Study II	Y	Y	O	P	NA	Y	Y	Y	6
Haskard et al 2009	Y	Y	O	P	NA	Y	Y	N	5
Hunfeld et al 1999	Y	Y	O	P	NA	Y	Y	N	5
Koss et al 1997	Y	Y	O	P	NA	Y	Y	N	5
Larsen et al 1981	Y	Y	O	P	NA	Y	N	N	4
Mead et al 2002	Y	N	O	P	NA	Y	Y	N	4
Oths 1994	Y	Y	O	P	NA	Y	Y	N	5
Paasche-Orlow et al 2003	Y	N	O	P	NA	Y	Y	Y	5
Pereira et al 2005	Y	Y	P	P	NA	Y	Y	N	5
Putnam et al 1985	Y	Y	O	P	NA	Y	Y	Y	6
Rowland-Morin et al 1990	Y	N	O	P	NA	Y	Y	N	4
Smith et al 1981	Y	Y	O	P	NA	Y	Y	N	5
Stiles et al 1979	Y	Y	O	P	NA	Y	Y	N	5
Street et al 1987	Y	Y	O	P	NA	Y	Y	N	5

Use of a representative sample: participants were selected as consecutive or random cases; *Having a defined sample:* description of participant source and inclusion and exclusion criteria; *Use of blinding:* assessor was unaware of prognostic factors at the time of outcome assessment (for communication factors and/or satisfaction); *Follow-up rate >85%:* outcome data were available for over 85% of participants at one follow-up point; *Appropriate choice of outcomes measures:* data and details of assessment methods were described; *Reporting outcome data at follow-up:* report numbers mean or events of outcomes; *Control for confounding via statistical adjustment:* multivariate analysis conducted with adjustment for potentially confounding factors.

Y = yes, N = no, NA = not applicable, O = neutral observer coded, P = patient coded

No longitudinal analysis investigated the association between communication factors and satisfaction with care such as symptom relief. Therefore all the data obtained by the review were from cross-sectional analyses.

Correlations between communication factors and satisfaction with care
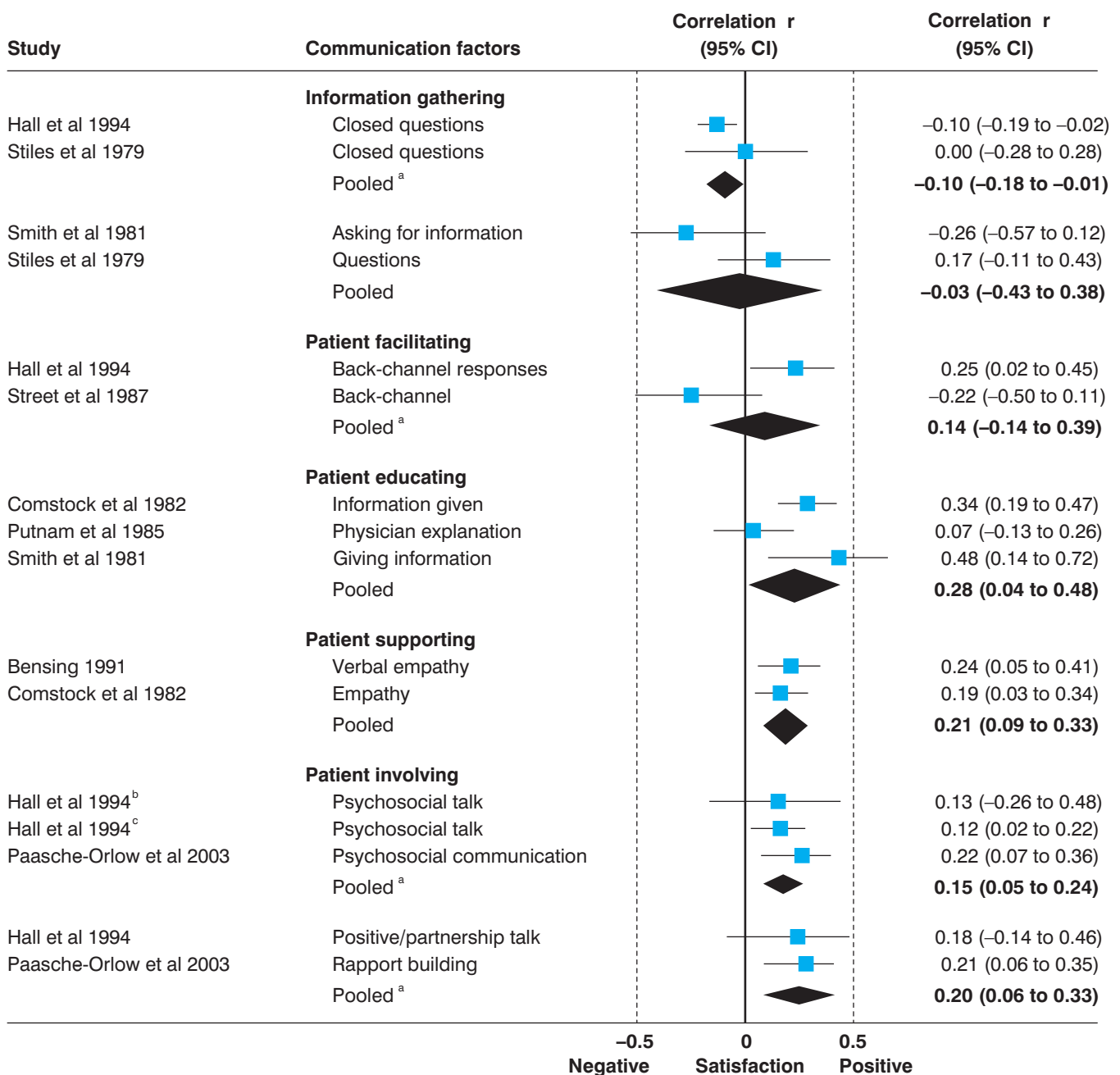
In total, 129 communication factors were identified in the review, 75 (58%) of which were not associated with satisfaction with care. Correlation values were reported for 108 of the 129 identified communication factors.

Satisfaction with the consultation

Association between communication factors and satisfaction with the consultation was investigated for 106 factors of those 108 reporting correlation values. They have been categorised into verbal factors, nonverbal factors, or interaction style.

Verbal factors: Pooled analysis was possible for seven verbal factors employed by clinicians reported in nine studies (Bensing 1991, Comstock et al 1982, Hall et al 1994 studies I and II, Paasche-Orlow and Roter 2003, Putnam et al 1985, Smith et al 1981, Stiles et al 1979, Street and Buller 1987) (Figure 2). Use of closed questions to gather information as a facilitator of communication was poorly and negatively correlated with satisfaction with consultation (pooled r = –0.10, 95% CI –0.18 to –0.01, n = 574). Verbal expressions of empathy had a fair, positive correlation (pooled r = 0.21, 95% CI 0.09 to 0.33, n = 253) and psychosocial talk (pooled r = 0.15, 95% CI 0.05 to 0.24, n = 1185) and partnership/

Study	Communication factors	Correlation r (95% CI)	Correlation r (95% CI)
Information gathering			
Hall et al 1994	Closed questions		–0.10 (–0.19 to –0.02)
Stiles et al 1979	Closed questions		0.00 (–0.28 to 0.28)
	Pooled [a]		**–0.10 (–0.18 to –0.01)**
Smith et al 1981	Asking for information		–0.26 (–0.57 to 0.12)
Stiles et al 1979	Questions		0.17 (–0.11 to 0.43)
	Pooled		**–0.03 (–0.43 to 0.38)**
Patient facilitating			
Hall et al 1994	Back-channel responses		0.25 (0.02 to 0.45)
Street et al 1987	Back-channel		–0.22 (–0.50 to 0.11)
	Pooled [a]		**0.14 (–0.14 to 0.39)**
Patient educating			
Comstock et al 1982	Information given		0.34 (0.19 to 0.47)
Putnam et al 1985	Physician explanation		0.07 (–0.13 to 0.26)
Smith et al 1981	Giving information		0.48 (0.14 to 0.72)
	Pooled		**0.28 (0.04 to 0.48)**
Patient supporting			
Bensing 1991	Verbal empathy		0.24 (0.05 to 0.41)
Comstock et al 1982	Empathy		0.19 (0.03 to 0.34)
	Pooled		**0.21 (0.09 to 0.33)**
Patient involving			
Hall et al 1994 [b]	Psychosocial talk		0.13 (–0.26 to 0.48)
Hall et al 1994 [c]	Psychosocial talk		0.12 (0.02 to 0.22)
Paasche-Orlow et al 2003	Psychosocial communication		0.22 (0.07 to 0.36)
	Pooled [a]		**0.15 (0.05 to 0.24)**
Hall et al 1994	Positive/partnership talk		0.18 (–0.14 to 0.46)
Paasche-Orlow et al 2003	Rapport building		0.21 (0.06 to 0.35)
	Pooled [a]		**0.20 (0.06 to 0.33)**

–0.5   0   0.5
Negative   **Satisfaction**   **Positive**

Figure 2. Pooled data for correlation of verbal factors with satisfaction with consultation.

[a] Same construct investigated on subgroups of the same study was pooled (subgroups of clinicians: male or female, internists or family practice; subgroup of patients: male or female). [b] Study I. [c] Study II.

rapport building to involve patients (pooled r = 0.20, 95% CI 0.06 to 0.33, n = 661) were poorly and positively correlated. Partnership building is the use of partnership statements, paraphrasing, and requests for patient's opinion (Hall et al 1994). Interestingly, giving information to educate patients had a fair, positive correlation with satisfaction with consultation (pooled r = 0.28, 95% CI 0.04 to 0.48, n = 281), however, findings from individual studies were inconsistent for similar constructs, with r values ranging from –0.02 to 0.20 (Table 3).

Table 3. Individual data for verbal factors reporting a correlation value with satisfaction with consultation.

Type of verbal factor / Study	Factors	Correlation value (95% CI)
Information gathering		
Greene et al 1994	Use of questions in negative	0.30 (0.09 to 0.49)
Hall et al 1994[a]	Open questions	–0.08 (–0.17 to 0.01)
Mead et al 2002	Psychosocial questions	–0.15 (–0.29 to 0.00)
Patient facilitating		
Rowland-Morin et al 1990	Language reciprocity	0.48 (0.24 to 0.67)
Gordon et al 2000	Expressions of uncertainty	0.40 (0.28 to 0.51)
Hall et al 1981	Anxiety	–0.33 (–0.56 to –0.06)
Greene et al 1994	Use of social niceties	0.15 (–0.07 to 0.36)
Greene et al 1994	Use of social compliments	0.08 (–0.14 to 0.29)
Comstock et al 1982	Courtesy	0.36 (0.21 to 0.49)
Patient educating		
Greene et al 1994	Informing on patient-raised topics	0.13 (–0.09 to 0.34)
Greene et al 1994	Informing on physician-raised topics	0.07 (–0.15 to 0.28)
Greene et al 1994	Orienting next steps	0.19 (–0.03 to 0.39)
Smith et al 1981	Giving suggestions	–0.02 (–0.38 to 0.35)
Smith et al 1981	Giving opinions	0.03 (–0.34 to 0.39)
Stiles et al 1979	Feedback	0.20 (–0.08 to 0.45)
Stiles et al 1979	Patient termination	0.12 (–0.16 to 0.39)
Stiles et al 1979	Clarification	0.15 (–0.13 to 0.41)
Patient supporting		
Mead et al 2002	Verbal caring	0.19 (0.04 to 0.33)
Hall et al 1981	Sympathy	0.46 (0.21 to 0.66)
Greene et al 1994	Supportiveness on patient-raised topics	0.24 (0.02 to 0.44)
Greene et al 1994	Supportiveness on physician-raised topics	0.20 (–0.02 to 0.40)
Hall et al 1994	Supportive talk: male physician and female patient	0.58 (0.43 to 0.70)
Bensing 1991	Encouraging	0.03 (–0.16 to 0.22)
Greene et al 1994	Patience	0.13 (–0.09 to 0.34)
Greene et al 1994	Respectful	0.07 (–0.15 to 0.28)
Smith et al 1981	Providing reassurance	–0.16 (–0.50 to 0.22)
Smith et al 1981	Showing agreement	–0.16 (–0.50 to 0.22)
Patient involving		
Bensing 1991	Clarifying reasons	0.00 (–0.19 to 0.19)
Greene et al 1994	Questioning on patient-raised topics	0.27 (0.06 to 0.46)
Greene et al 1994	Questioning on physician-raised topics	0.06 (–0.16 to 0.28)
Bensing 1991	Purposive probing (introduction of new ideas)	0.23 (0.04 to 0.41)
Bensing 1991	Structuring	–0.02 (–0.21 to 0.17)
Paasche-Orlow et al 2003[a]	Biomedical communication	0.04 (–0.04 to 0.12)
Cecil et al 1997	Dominant physician	–0.27 (–0.51 to 0.01)
Rowland-Morin et al 1990	Ratio of physician's to patient's interruptions	0.26 (–0.01 to 0.50)
Street et al 1987	Interruptions	–0.18 (–0.47 to 0.15)
Hall et al 1994[a]	Successful interruptions during simultaneous speech	0.03 (–0.30 to 0.36)
Hall et al 1994[a]	Partially successful interruptions during joint speech	–0.16 (–0.36 to 0.05)
Hall et al 1994[a]	Unsuccessful interruptions during simultaneous speech	–0.07 (–0.42 to 0.30)
Bensing 1991	Patient-centered at diagnostic phase	0.12 (–0.08 to 0.31)
Bensing 1991	Patient-centered at therapeutic phase	0.04 (–0.16 to 0.23)
Paasche-Orlow et al 2003[a]	Patient-centeredness	0.15 (–0.06 to 0.34)
Smith et al 1981	Casual conversation	–0.11 (–0.46 to 0.27)
Smith et al 1981	Asking for opinions	0.19 (–0.19 to 0.52)
Mead et al 2002	Time for the patient	0.09 (–0.06 to 0.24)
Mead et al 2002	Involving the patient	–0.10 (–0.25 to 0.05)
Comstock et al 1982	Listening	0.27 (0.12 to 0.41)
Greene et al 1994	Engaged	0.22 (0.00 to 0.42)
Stiles et al 1979	Interest in further objective information	–0.08 (–0.35 to 0.20)
Greene et al 1994	Shared decision-making	0.14 (–0.08 to 0.35)
Greene et al 1994	Sharing information	0.01 (–0.21 to 0.23)
Greene et al 1994	Treating patient equal	0.08 (–0.14 to 0.29)

[a] Pooling of subgroups by gender pairs or clinicians within individual studies

Individual studies found fair to moderate correlations between verbal communication factors and satisfaction. The strongest associations were observed for use of negative questions (r = 0.30) to gather information; language reciprocity (r = 0.48) and expressions of uncertainty (r = 0.40) as facilitators; expressions of support and sympathy (r ranging from 0.19 to 0.58); listening (r = 0.27) and engaging (r = 0.22) to involve patients. They were reported to have a positive correlation with satisfaction with consultation (Table 3). Language reciprocity is the use of similar words by both the patient and the clinician (Rowland-Morin and Carroll 1990), and expression of uncertainty is the direct and unambiguous expression of uncertainty (eg, use of the expression 'I don't know') (Gordon et al 2000). Use of psychosocial questions (r = –0.15, 95% CI –0.29 to 0.00) and use of social niceties such as the expression 'Thank you' (r = 0.15, 95% CI –0.07 to 0.36) were not correlated with satisfaction with the consultation.

Nonverbal factors: Pooled analysis was possible for four nonverbal factors employed by clinicians reported in seven studies (Bensing 1991, Comstock et al 1982, Greene et al 1994, Hunfeld et al 1999, Mead et al 2002, Smith et al 1981, Street and Buller 1987) (Figure 3). The nonverbal factors of length of consultation (pooled r = 0.30, 95% CI 0.08 to 0.49, n = 260) and nonverbal caring expressions of support (pooled r = 0.24, 95% CI 0.10 to 0.36, n = 197) had a fair,

positive correlation with satisfaction with consultation. Showing interest as a facilitator had a fair, positive correlation (pooled r = 0.23, 95% CI 0.05 to 0.39, n = 127).

Individual studies showed that the strongest associations were reported for discussing prevention (r = 0.53) (Smith et al 1981) and ability to decode body language, defined as the ability to understand patients' nonverbal body language expressions except facial expression (r = 0.36) (DiMatteo et al 1979, DiMatteo and Taranta 1979, DiMatteo et al 1980). Positive associations were also found for ability to decode (r = 0.16) and encode (r = 0.30) tone of voice (DiMatteo et al 1979, DiMatteo and Taranta 1979, DiMatteo et al 1980) and shared laughter (r = 0.34) (Greene et al 1994) to facilitate and involve patients (Table 4). Use of nonverbal factors that appeared to avoid negative communication (r =-0.30) and time spent reading patient charts while patients are interacting with clinicians (r =-0.69) were negatively correlated with satisfaction. Anxious tone of voice used by clinicians had a fair, positive correlation (r = 0.32), and verbal expressions of anxiety had a fair, negative correlation (r =-0.33) with satisfaction with consultation.

Interaction style: The use of a caring interaction style that showed support for patients (ie, clinicians being sensitive, friendly, relaxed, and open) was examined in two studies
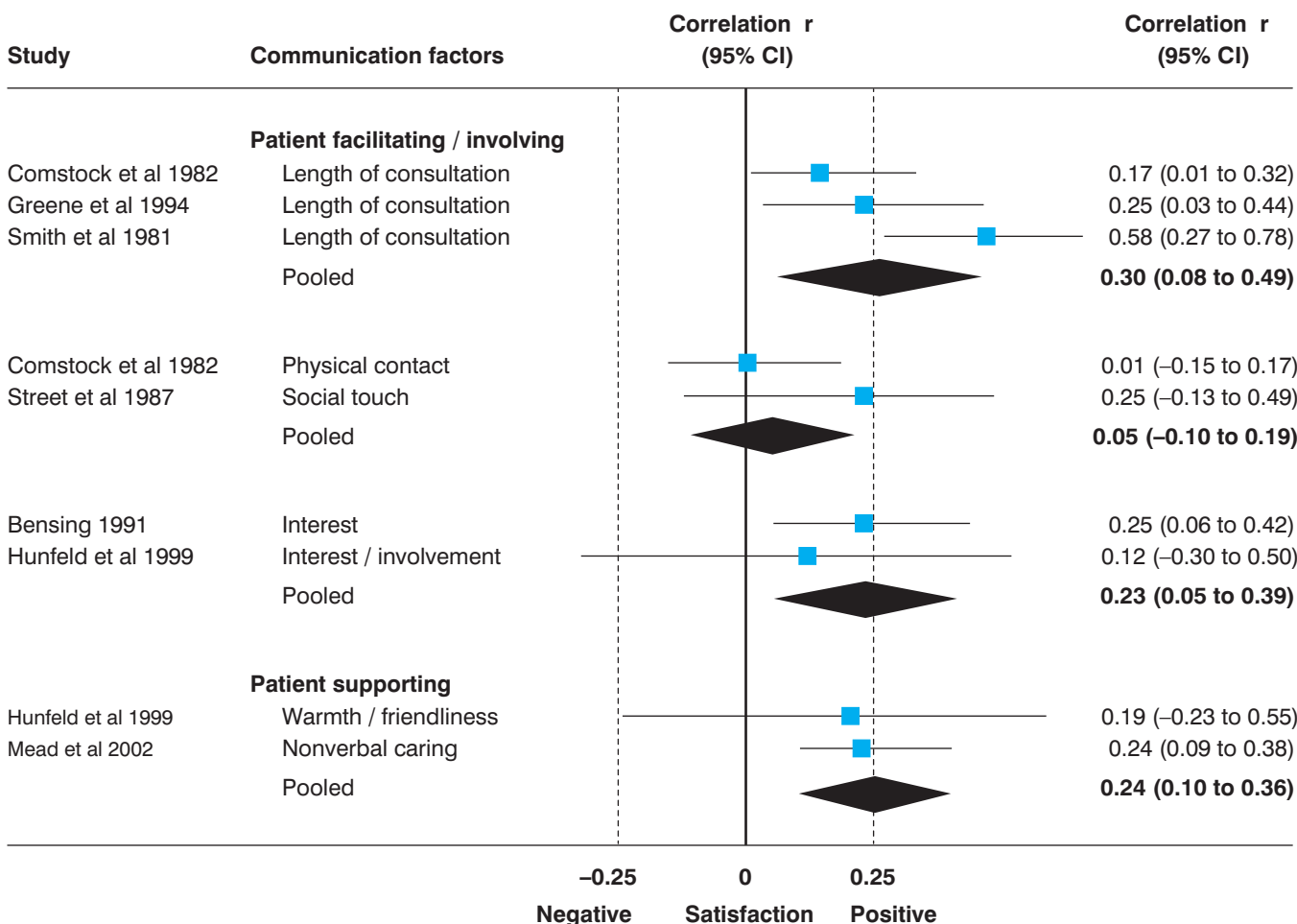
Study	Communication factors	Correlation r (95% CI)		Correlation r (95% CI)
	Patient facilitating / involving			
Comstock et al 1982	Length of consultation			0.17 (0.01 to 0.32)
Greene et al 1994	Length of consultation			0.25 (0.03 to 0.44)
Smith et al 1981	Length of consultation			0.58 (0.27 to 0.78)
	Pooled			**0.30 (0.08 to 0.49)**
Comstock et al 1982	Physical contact			0.01 (–0.15 to 0.17)
Street et al 1987	Social touch			0.25 (–0.13 to 0.49)
	Pooled			**0.05 (–0.10 to 0.19)**
Bensing 1991	Interest			0.25 (0.06 to 0.42)
Hunfeld et al 1999	Interest / involvement			0.12 (–0.30 to 0.50)
	Pooled			**0.23 (0.05 to 0.39)**
	Patient supporting			
Hunfeld et al 1999	Warmth / friendliness			0.19 (–0.23 to 0.55)
Mead et al 2002	Nonverbal caring			0.24 (0.09 to 0.38)
	Pooled			**0.24 (0.10 to 0.36)**

–0.25   0   0.25
Negative   Satisfaction   Positive

Figure 3. Pooled data for correlation of nonverbal factors with satisfaction with consultation.

(Haskard et al 2009, Street and Buller 1987). The pooled data showed this clinician behaviour had a moderate, positive correlation with satisfaction with consultation (pooled r = 0.51, 95% CI 0.42 to 0.60, n = 273) (Figure 4).

Individual studies showed that clinicians being nervous, uncooperative or hurried had a fair, negative correlation with satisfaction (r =-0.34) whereas being professional when interacting with patients had a fair, positive correlation

(r = 0.36) (Table 5). Being professional is defined as clinicians being competent, active, efficient, and interested (Haskard et al 2009).

Satisfaction with treatment approach

Correlation between communication factors and satisfaction with treatment was investigated for only two factors. Verbal affect (r = 0.34, 95% CI 0.09 to 0.55) had a fair, positive correlation with satisfaction with treatment approach (Oths

Table 4. Individual data for nonverbal factors reporting a correlation value with satisfaction with consultation.

Type of nonverbal factor Study	Factors	Correlation value (95% CI)
Patient facilitating/involving		
Hall et al 1994[a]	Voice tone dominant/assertive	−0.12 (−0.21 to −0.04)
Hunfeld et al 1999	Nonverbal dominance/assertiveness	0.51 (0.13 to 0.76)
Smith et al 1981	Time spent discussing prevention	0.53 (0.20 to 0.75)
DiMatteo et al 1980, 1979, 1979	Ability to decode body language	0.36 (0.28 to 0.44)
DiMatteo et al 1980, 1979, 1979	Ability to decode content-filtered voice tone	−0.02 (−0.11 to 0.07)
DiMatteo et al 1980, 1979, 1979	Ability to decode facial language	0.06 (−0.03 to 0.15)
DiMatteo et al 1980, 1979, 1979	Ability to decode randomised spliced voice tone	0.16 (0.07 to 0.25)
DiMatteo et al 1980, 1979, 1979	Ability to encode voice tone	0.30 (0.22 to 0.38)
Greene et al 1994	Shared laughter	0.34 (0.13 to 0.52)
Hall et al 1981	Anxious voice tone	0.32 (0.05 to 0.55)
DiMatteo et al 1980, 1979, 1979	Ability to encode positive intent voice tone, avoiding negative communication	-0.30 (−0.38 to-0.22)
Smith et al 1981	Time spent reading patient's chart	-0.69 (−0.84 to-0.43)
Street et al, 1987	Turn duration	0.04 (−0.28 to 0.36)
Rowland-Morin et al 1990	Silence time	0.25 (−0.03 to 0.49)
Street et al 1987	Pause in relation to turn duration	-0.19 (−0.48 to 0.14)
Street et al 1987	Response latency	0.09 (−0.24 to 0.40)
Bensing 1991	Eye contact	0.06 (−0.14 to 0.25)
Comstock et al 1982	Eye contact, body position and gestures giving attention	0.12 (−0.04 to 0.28)
Street et al 1987	Gaze away from patients	0.23 (−0.10 to 0.51)
Duggan et al 2001	Facial reinforces in introduction	0.24 (−0.11 to 0.54)
Duggan et al 2001	Facial reinforces in diagnosis	0.06 (−0.28 to 0.39)
Duggan et al 2001	Negative facial behaviours in introduction	0.08 (−0.27 to 0.41)
Duggan et al 2001	Negative facial behaviours in diagnosis	0.16 (−0.19 to 0.47)
Duggan et al 2001	Smiling in introduction	0.16 (−0.19 to 0.47)
Duggan et al 2001	Smiling in diagnosis	0.23 (−0.12 to 0.53)
Duggan et al 2001	Indirect orientation in introduction	0.27 (−0.08 to 0.56)
Duggan et al 2001	Indirect orientation in diagnosis	−0.26 (−0.55 to 0.09)
Street et al 1987	Indirect body orientation	−0.21 (−0.50 to 0.12)
Smith et al 1981	Time spent within 3 feet of patient	0.20 (−0.18 to 0.53)
Street et al 1987	Illustrative gestures	−0.13 (−0.43 to 0.20)
Koss et al 1997	Interactional synchrony	0.05 (−0.24 to 0.33)
Hall et al 1981	Angry voice tone	0.37 (0.10 to 0.59)
Hunfeld et al 1999	Anger/irritation	0.06 (−0.35 to 0.45)
Hall et al 1981	Voice tone indicating probability of return	−0.14 (−0.40 to 0.14)
Hall et al 1994[a]	Voice tone interested/concerned	0.04 (−0.11 to 0.19)
Duggan et al 2001	Disfluencies in introduction	0.05 (−0.29 to 0.38)
Duggan et al 2001	Disfluencies in diagnosis	0.35 (0.01 to 0.62)
Greene et al 1994	Consultation interruptions	0.07 (−0.15 to 0.28)
Patient supporting		
Koss et al 1997	Positivity	−0.09 (−0.37 to 0.20)

[a] Pooling of subgroups by gender pairs or clinicians within individual studies
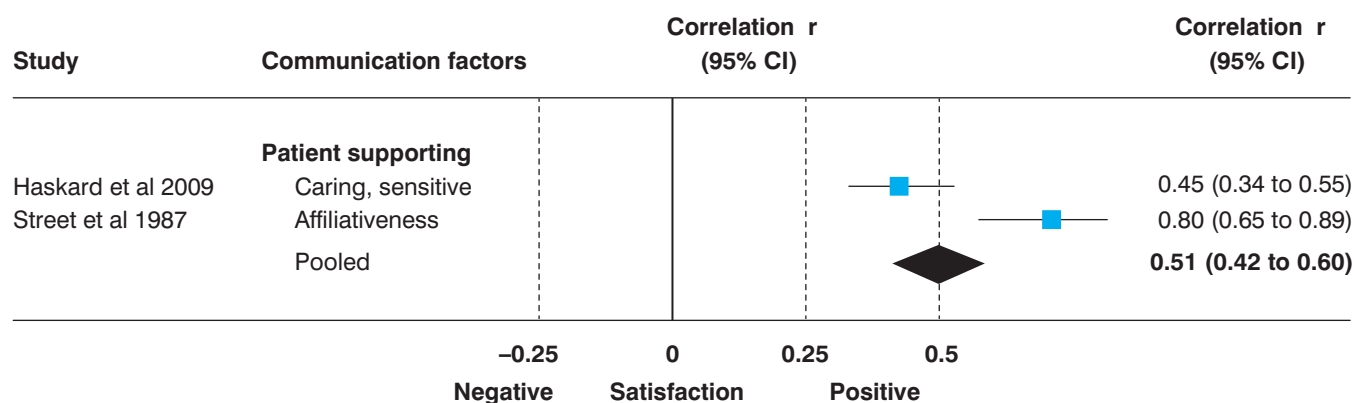
Figure 4. Pooled data for correlation of interaction style factors with satisfaction with consultation.

Table 5. Individual data for interaction style reporting a correlation value with satisfaction with consultation.

Type of interaction style factor Study	Factors	Correlation value (95% CI)
Patient facilitating/involving		
Haskard et al 2009	Nervous, unco-operative, hurried	−0.34 (−0.45 to −0.22)
Street et al 1987	Dominance	−0.22 (−0.50 to 0.11)
Haskard et al 2009	Being professional	0.36 (0.24 to 0.47)

1994), whereas length of treatment (nonverbal) was poorly correlated (r = 0.12, 95% CI −0.15 to 0.37) (Oths 1994) (Table 6).

Satisfaction with clinical outcomes

Correlations between communication factors and satisfaction with clinical outcomes, such as symptom relief, were not assessed in any of the studies.

Other associations between communication factors and satisfaction with care

Correlation values were not reported for 21 of the identified factors. The significance of the association estimates was provided using *p* values for 12 of these factors. Use of forward leaning ($p < 0.01$) and body orientation ($p = 0.05$) to facilitate and involve patients was reported as being positively associated with satisfaction with consultation (Larsen and Smith 1981). Clinicians showing affect ($p < 0.01$) (Gilbert and Hayes 2009), clinician attention ($p < 0.00001$) (Gilbert and Hayes 2009, Pereira and Azevedo 2005), socio-emotional communication ($p = 0.024$) (Graugaard et al 2005), punctuality ($p < 0.002$) and being communicative ($p < 0.05$) (Pereira and Azevedo 2005) were also reported as being positively associated with satisfaction with care. Backward leaning ($p < 0.01$), neck relaxation ($p < 0.01$), touching ($p < 0.05$) (Larsen and Smith 1981) and clinicians expressing concern ($p < 0.01$) (Gilbert and Hayes 2009) when used in facilitation and involvement of patients were reported as being negatively associated with satisfaction. Among other identified factors not reporting correlation values, no association was reported for verbal dominance (Graugaard et al 2005). Interestingly higher satisfaction with consultation was found when clinicians used a patient-centred care approach compared to clinician-centred, biomedical and biopsychosocial approaches ($p = 0.02$) (Flocke et al 2002). However, inconsistency in the association was found when compared with the study reporting a correlation value (Paasche-Orlow and Roter 2003) (Table 3).

Discussion

The current study found that 38 of the communication factors investigated were associated with patient ratings of satisfaction with care and, for those factors for which correlation values were reported, most had a fair correlation. The number of potentially modifiable communication factors associated with satisfaction with care and the magnitude of their association partially support interventions of communication skills training valuing patient autonomy. Previous investigations of effectiveness of theory-based training of communication skills (eg, patient-centred care and shared decision-making) have reported no effect on satisfaction with care (Brown et al 1999, Edwards et al 2004, Uitterhoeve et al 2010). It is possible that previous trials have tested interventions built on communication factors that are not evidence-based. Based on the results of our review a small number of communication factors were found that could form the basis for intervention for communication skills training. However, those factors valuing patient autonomy were inconsistently associated with satisfaction with care (eg, verbal expressions valuing patient-centred care). Patient-autonomy approaches involve a biopsychosocial perspective to understand patient's experiences, share responsibility and develop relationships based on emotional support (Abdel-Tawab and Roter 2002). Our findings (eg, length of consultation, showing interest, and being caring) sustain the understanding of patients' experiences and developing relationship based on emotional support rather than sharing responsibility. Interestingly consistency found among verbal, nonverbal and interaction style for being caring shows that behaviours without speech content of emotional support should be also considered during the interaction.

Table 6. Individual data for verbal and nonverbal factors reporting a correlation value with satisfaction with treatment.

Type of (non)verbal factor Study	Factors	Correlation value (95% CI)
Patient facilitating		
Oths 1994	Affect	0.34 (0.09 to 0.55)
Oths 1994	Length of treatment	0.12 (−0.15 to 0.37)

Over half of the identified factors in the current review (n = 75) were never associated with satisfaction with care. We found fewer communication factors, and a weaker association with patient ratings of satisfaction with care, than reported in previous systematic reviews (Beck et al 2002, Hall et al 1988). The poor association seems unexpected for some communication factors used by clinicians, such as using psychosocial questions, using social niceties and smiling. Training protocols aimed at improving clinician communication skills proposed in the USA and recommended in health settings in other countries such as Honduras, Trinidad and Tobago, and Egypt emphasise the optimisation of these factors (Negri et al 1999). Based on the results of our study, training protocols and communication interventions should be checked for communication factors not likely to deserve attention.

We could not identify any study investigating the predictive ability of communication factors on patient ratings of satisfaction with the treatment approach implemented or with clinical outcomes, such as symptom relief or reduction in disability levels. Although this gap in knowledge was first noted in a systematic review on communication factors published in 1988 (Hall et al 1988), there has been no advance in the field since then. Although previous studies have reported that patient satisfaction with care was associated with clinical outcomes of health interventions (Alazri and Neal 2003, Hirsh et al 2005), an analysis of the direct impact of specific communication factors on important clinical outcomes is still warranted, potentially to enable improvement of communication skills with training.

In a systematic review recently conducted by our group (Ferreira et al 2011) to examine the effectiveness of training communication skills on the quality of the interaction between patients and clinicians, we found that the interventions currently used to improve communication skills do not improve clinical outcomes in a variety of health settings. Additionally, randomised controlled trials conducted in the USA (Brown et al 1999) and UK (Edwards et al 2004) to improve the communication skills of physicians in primary care and rehabilitation settings reported no effect on patient satisfaction with care. We argue that training of contemporary communication skills should consider not only the theory supporting specific strategies but also specific factors that have been shown to correlate with how patients perceive the quality of care.

The investigated settings involved clinicians and patients from primary care and rehabilitation settings where patients' needs are similar to patients who seek physiotherapy. We believe that our findings are the best available evidence to guide physiotherapists.

In general, our results suggest that few factors are likely to impact on patient satisfaction with care. Communication factors with substantial associations (r ranging from 0.61 to 0.80) included time spent reading patient charts. No factor identified in this review showed a high association (r > 0.81) with patient ratings of satisfaction with care. Comparison of communication factors associated with satisfaction with care among different cultures was not possible as most included studies (69%) were conducted in the USA.

We identified inconsistency in the use of classification systems (eg, Roter Interaction Analysis System, Bales Process Analysis System, Verbal Response Mode, and Stiles Coding System) to code communication factors across studies. Studies appear to use different definitions for similar constructs and categories (eg, courtesy and social niceties such as 'please have a seat' and 'thank you') (Comstock et al 1982, Greene et al 1994). Moreover, studies counted frequency of factors in different ways or used heterogeneous time slices of consultation to code factors (DiMatteo et al 1980, Duggan and Parrott 2000, Mead et al 2002, Street and Buller 1987). This could be responsible for the significant variation in the size of correlation estimates between factors and satisfaction with care among studies for the same construct. Zimmermann et al (2011) found an overall agreement of only 3% for coding patients' expressions of concern among 10 different classification systems.

The reliability estimates on the use of the communication coding systems have also been reported as poor (eg, intra-coder reliability of 0.1, inter-coder reliability of 0.2) (Mead et al 2002, Street and Buller 1987). The use of these unreliable systems may account for conflicting findings for the association of a specific communication construct with satisfaction with care, as for instance the directional contrast in correlation estimates shown for the verbal factor *anxiety* (r = −0.33) and the nonverbal factor *anxious* tone of voice (r = 0.32) used by clinicians (Hall et al 1981).

Another limitation of this review is that in order to reduce the complexity in reporting the findings we did not investigate how the characteristics of the consultation (eg, gender and context) modify association between communication factors and satisfaction with care. These analyses are currently underway.

In conclusion, 38 communication factors were identified as consistently associated with patient ratings of satisfaction with care. The number of potential modifiable communication factors associated with satisfaction with care and the magnitude of their association partially support interventions of communication skills training valuing patient autonomy. These factors could be used by physiotherapists, for instance, to build an interaction with their patients, based on emotional support (eg, length of consultation, interest, and caring). Further investigations should focus on these factors and their predictive ability on clinical outcomes associated with health care interventions. Communication skills training should include specific communication factors likely to reflect patient satisfaction with care. ∎

References

Abdel-Tawab N, Roter D (2002) The relevance of client-centered communication to family planning settings in developing countries: lessons from the Egyptian experience. *Social Science & Medicine* 54: 1357–1368.

Alazri MH, Neal RD (2003) The association between satisfaction with services provided in primary care and outcomes in Type 2 diabetes mellitus. *Diabetic Medicine* 20: 486–490.

Beck RS, Daughtridge R, Sloane PD (2002) Physician-patient communication in the primary care office: a systematic review. *The Journal of the American Board of Family Practice* 15: 25–38.

Bensing J (1991) Doctor-patient communication and the quality of care. *Social Science & Medicine* 32: 1301–1310.

Brown JB, Boles M, Mullooly JP, Levinson W (1999) Effect of clinician communication skills training on patient satisfaction. A randomized, controlled trial. *Annals of Internal Medicine* 131: 822–829.

Casserley-Feeney SN, Phelan M, Duffy F, Roush S, Cairns MC, Hurley DA (2008) Patient satisfaction with private physiotherapy for musculoskeletal pain. *BMC Musculoskeletal Disorders* 9: 50.

Cecil DW, Killeen I (1997) Control, compliance, and satisfaction in the family practice encounter. *Family Medicine* 29: 653–657.

Comstock LM, Hooper EM, Goodwin JM, Goodwin JS (1982) Physician behaviors that correlate with patient satisfaction. *Journal of Medical Education* 57: 105–112.

Daaleman TP, Mueller J (2004) Chatting behavior and patient satisfaction in the outpatient encounter. *Journal of the National Medical Association* 96: 666–670.

Del Piccolo L, Mazzi M, Saltini A, Zimmermann C (2002) Inter and intra individual variations in physicians' verbal behaviour during primary care consultations. *Social Science & Medicine* 55: 1871–1885.

DiMatteo M, Friedman HS, Taranta A (1979) Sensitivity to bodily nonverbal communication as a factor in practitioner-patient rapport. *Journal of Nonverbal Behavior* 4: 18–26.

Dimatteo M, Taranta A (1979) Nonverbal communication and physician-patient rapport: an empirical study. *Professional Psychology* 10: 540–547.

DiMatteo MR, Taranta A, Friedman HS, Prince LM (1980) Predicting patient satisfaction from physicians' nonverbal communication skills. *Medical Care* 18: 376–387.

Duggan AP, Parrott RL (2000) Research note: Physicians' nonverbal rapport building and patients' talk about the subjective component of illness. *Human Communication Research* 27: 299–311.

Edwards A, Elwyn G, Hood K, Atwell C, Robling M, Houston H, et al (2004) Patient-based outcome results from a cluster randomized trial of shared decision making skill development and use of risk communication aids in general practice. *Family Medicine* 21: 347–354.

Ferreira PH, Lam C, Ferreira ML, Tong LKN, Pinto RZ, Oliveira VC (2011) Effect of communication training on health providers to improve therapeutic alliance. *Melbourne International Forum XI on Low Back Pain*: 132.

Finch EA, Linde JA, Jeffery RW, Rothman AJ, King CM, Levy RL (2005) The effects of outcome expectations and satisfaction on weight loss and maintenance: correlational and experimental analyses – a randomized trial. *Health Psychology* 24: 608–616.

Flocke SA, Miller WL, Crabtree BF (2002) Relationships between physician practice style, patient satisfaction, and attributes of primary care. *Journal of Family Practice* 51: 835–840.

Gilbert DA, Hayes E (2009) Communication and outcomes of visits between older patients and nurse practitioners. *Nursing Research* 58: 283–293.

Gordon GH, Joos SK, Byrne J (2000) Physician expressions of uncertainty during patient encounters. *Patient Education and Counseling* 40: 59–65.

Graugaard PK, Holgersen K, Eide H, Finset A (2005) Changes in physician-patient communication from initial to return visits: A prospective study in a haematology outpatient clinic. *Patient Education and Counseling* 57: 22–29.

Greene MG, Adelman RD, Friedmann E, Charon R (1994) Older patient satisfaction with communication during an initial medical encounter. *Social Science & Medicine* 38: 1279–1288.

Hall JA, Irish JT, Roter DL, Ehrlich CM, Miller LH (1994) Satisfaction, gender, and communication in medical visits. *Medical Care* 32: 1216–1231.

Hall JA, Roter DL, Katz NR (1988) Meta-analysis of correlates of provider behavior in medical encounters. *Medical Care* 26: 657–675.

Hall JA, Roter DL, Rand CS (1981) Communication of affect between patient and physician. *Journal of Health and Social Behavior* 22: 18–30.

Haskard KB, DiMatteo MR, Heritage J (2009) Affective and instrumental communication in primary care interactions: predicting the satisfaction of nursing staff and patients. *Health Communication* 24: 21–32.

Higgins JP, Thompson SG, Deeks JJ, Altman DG (2003) Measuring inconsistency in meta-analyses. *BMJ* 327: 557–560.

Hirsh AT, Atchison JW, Berger JJ, Waxenberg LB, Lafayette-Lucey A, Bulcourf BB, et al (2005) Patient satisfaction with treatment for chronic pain: predictors and relationship to compliance. *The Clinical Journal of Pain* 21: 302–310.

Hunfeld JA, Leurs A, De Jong M, Oberstein ML, Tibben A, Wladimiroff JW, Wildschut HI, et al (1999) Prenatal consultation after a fetal anomaly scan: videotaped exploration of physician's attitude and patient's satisfaction. *Prenatal Diagnosis* 19: 1043–1047.

Koss T, Rosenthal R (1997) Interactional synchrony, positivity and patient satisfaction in the physician-patient relationship. *Medical Care* 35: 1158–1163.

Landis JR, Koch GG (1977) The measurement of observer agreement for categorical data. *Biometrics* 33: 159–174.

Larsen KM, Smith CK (1981) Assessment of nonverbal communication in the patient-physician interview. *Journal of Family Practice* 12: 481–488.

May S (2000) Patient satisfaction with management of back pain – Part 1: what is satisfaction? Review of satisfaction with medical management. *Physiotherapy* 87: 4–9.

Mead N, Bower P, Hann M (2002) The impact of general practitioners' patient-centredness on patients' post-consultation satisfaction and enablement. *Social Science & Medicine* 55: 283–299.

Negri B, Brown LD, Hernadez O, Rosenbaum J, Roter D (1999) Improving interpersonal communication between health care providers and clients. *Cochrane Database of Systematic Reviews*: 1–64.

Oths K (1994) Communication in a chiropractic clinic: how a D.C. treats his patients. *Culture, Medicine and Psychiatry* 18: 83–113.

Paasche-Orlow M, Roter D (2003) The communication patterns of internal medicine and family practice physicians. *The Journal of the American Board of Family Practice* 16: 485–493.

Pengel LH, Herbert RD, Maher CG, Refshauge KM (2003) Acute low back pain: systematic review of its prognosis. *BMJ* 327: 323.

Pereira MdGA, Azevedo ES (2005) [Patient-physician relationship in Acre, Rio Branco, from the patient's point of view.]. *Revista da Associação Médica Brasileira* 51: 153–157.

Putnam SM, Stiles WB, Jacob MC, James SA (1985) Patient exposition and physician explanation in initial medical interviews and outcomes of clinic visits. *Medical Care* 23: 74–83.

Rowland-Morin PA, Carroll JG (1990) Verbal communication skills and patient satisfaction. A study of doctor-patient interviews. *Evaluation & the Health Professions* 13: 168–185.

Rubin HR, Gandek B, Rogers WH, Kosinski M, McHorney CA, Ware JE, Jr. (1993) Patients' ratings of outpatient visits in different practice settings. Results from the Medical Outcomes Study. *JAMA* 270: 835–840.

Sheppard LA, Anaf S, Gordon J (2010) Patient satisfaction with physiotherapy in the emergency department. *International Emergency Nursing* 18: 196–202.

Small M, Anderson P, Vickers A, Kay S, Fermer S (2011) Importance of inhaler-device satisfaction in asthma treatment: real-world observations of physician-observed compliance and clinical/patient-reported outcomes. *Advances in Therapy* 28: 202–212.

Smith CK, Polis E, Hadac RR (1981) Characteristics of the initial medical interview associated with patient satisfaction and understanding. *Journal of Family Practice* 12: 283–288.

Stiles WB, Putnam SM, Wolf MH, James SA (1979) Interaction exchange structure and patient satisfaction with medical interviews. *Medical Care* 17: 667–681.

Street RL, Buller DB (1987) Nonverbal response patterns in physician-patient interactions: a functional analysis. *Journal of Nonverbal Behavior* 11: 234–253.

Uitterhoeve RJ, Bensing JM, Grol RP, Demulder PH, Van Achterberg T (2010) The effect of communication skills training on patient outcomes in cancer care: a systematic review of the literature. *European Journal of Cancer Care* 19: 442–457.

Ware JE Jr., Snyder MK, Wright WR, Davies AR (1983) Defining and measuring patient satisfaction with medical care. *Evaluation and Program Planning* 6: 247–263.

WHO (1946) Constitution of the World Health Organization. *American Journal of Public Health* 36: 1315–1323.

WHO (2003) World Health Organization. Adherence to long-term therapies: evidence for action. [Accessed May 1, 2012].

Zimmermann C, Del Piccolo L, Bensing J, Bergvik S, De Haes H, Eide H, et al (2011) Coding patient emotional cues and concerns in medical consultations: the Verona coding definitions of emotional sequences (VR-CoDES). *Patient Education and Counseling* 82: 141–148.

Zimmermann C, Del Piccolo L, Finset A (2007) Cues and concerns by patients in medical consultations: a literature review. *Psychological Bulletin* 133: 438-463.