# A framework for assessing the oral literacy burden of medical dialogue: face, concurrent and predictive validity.

Debra Roter, DrPH
Professor
Johns Hopkins Bloomberg School of Public Health
Department of Health, Behavior and Society

# The need to reduce the literacy demand of health education print materials is widely recognized --and methods to do so are well known

Thousands of studies have established that the literacy demand of common print-based health education materials far exceeds average patient reading skills.

Lowering the literacy demand of these materials has become a national priority with legal ramifications. Every IRB in the country now mandates that informed consent print materials be written at the 8th grade level or below (Paasche-Orlow, NEJM, 2004).

# The need to reduce the literacy demand of the medical dialogue has received far less research attention although few question its importance.

Restricted literacy has been associated with poor comprehension and recall of complex *oral language*. Patients complain they are not given information about their problems **in ways they could understand.**.(Williams et al, 1998; Schillinger et al, 2004; Baker et al, 1996)

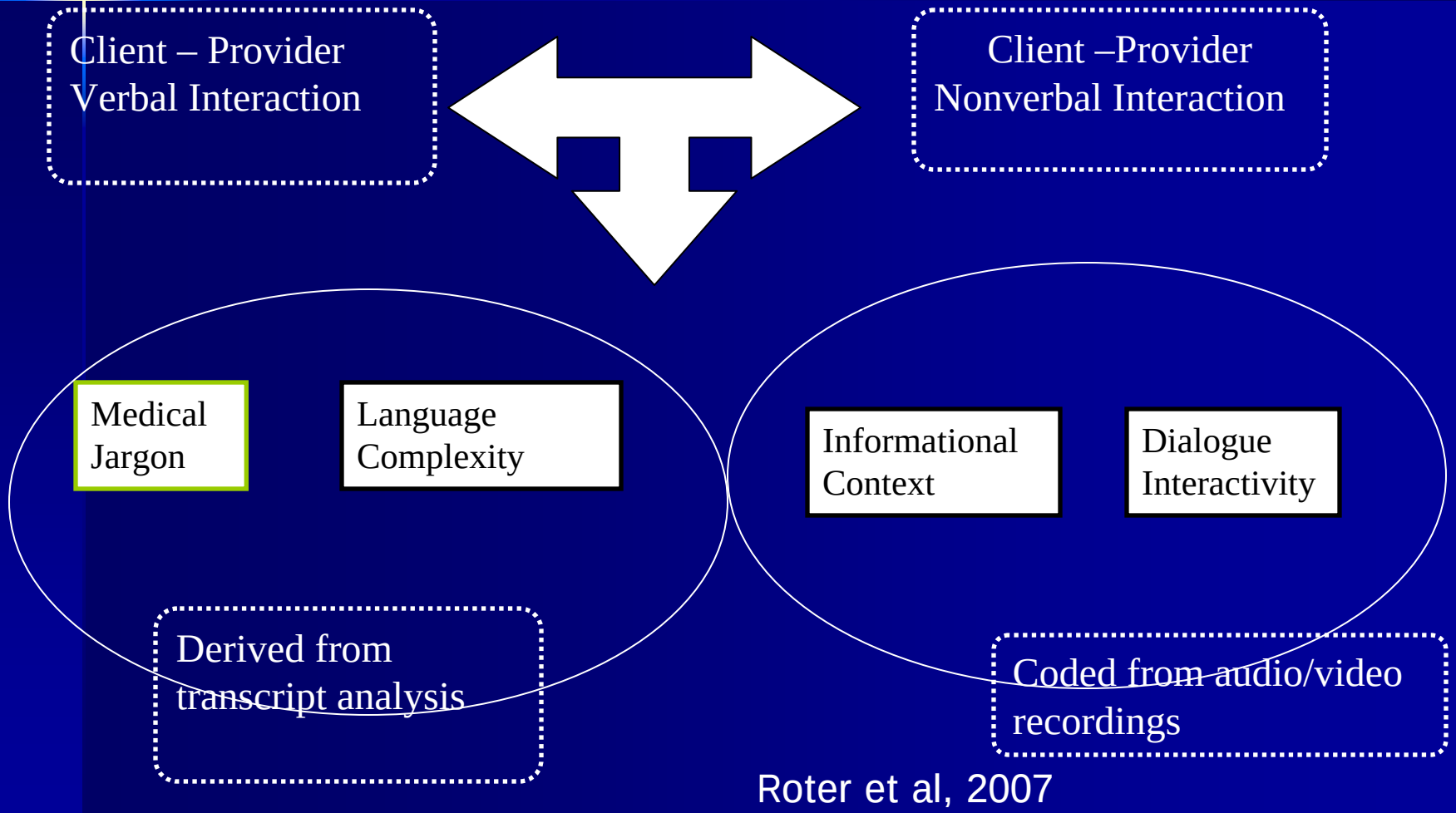
Low literacy may also be related to restricted expressive language. Patients note that **they do not feel listened to and have difficulty being understood**. (Baker et al, 1996; Bennett, 2006)

# Today's Objectives

Introduce a framework useful in understanding key oral literacy burden domains

Discuss evidence of face, concurrent and predictive validity of the framework

# Key Elements of Oral Literacy Demand




Roter et al, 2007

# Use of medical jargon

Derived from transcript analysis

Count of the number of different key terms used (term coverage)

Average number of repetitions of each term

Jargon use as % of all transcript words

*Variation
*Susceptibility
*Sporadic
*Hereditary
*Mutation
*Chromosome
*Abnormality
Uterus
Disorder
Instruction
Generation
Retardation
Surgery
Population
Miscarriage
Development
Condition
Carrier
Insurance
Ultrasound
Syndrome

Derived from transcript analysis

# General language complexity

- Measures include (Microsoft Grammar Summary):
  - Flesch-Kinkaid grade level
  - Flesch reading ease
  - Average number of syllables per word (ASW)
  - Average number of words per sentence
  - Percentage of transcript sentences in the passive voice

# Contextualized Information

Derived from audio/video analysis

Informational Context was calculated as the percentage of informational statements (derived from RIAS codes) that were given using a contextualized rather than decontextualized frame.

Personally Contextualized informational "Based on *what you told me about your history*, there is a 1 in 400 chance *that your baby will have one of these genetic mutations"*

Depersonalized context "Nobody has a risk of zero – a pregnant women over 35 has a 1 in 400 chance of having a baby with this genetic mutation"

# Dialogue Interactivity

Derived from audio/video analysis

Rate of floor exchange: the number of speaking turns per session minute. For example, a 14 minute PC visit may have 52 completed floor exchanges with an interactivity rate of 7.4 speaking turns per minute.

Turn density: the number of statements within a turn excluding the count of any second speaker back channels. Turn density can be calculated separately by speaker. Physician turns are likely to be more dense than patient turns (e.g., 4.2 statements vs 1.4 statements per turn, respectively).

Turn duration: seconds spanning the block of uninterrupted speech by speaker (including back channels). In the above example, turn duration averaged 13.7 seconds for physician and 2.9 seconds for patient.

Statement pace: pace of within-turn statements (duration divided by density) – for physicians, one statement every 3 seconds; for patients one statement every 2 seconds.

# Face, Concurrent and Predictive Validity?

Face Validity – parallels to print assessments

Relationship to patient-centeredness

Simulated Client Ratings – primary care and genetic counseling

Analogue Clients – learning of genetics related information

# Interactivity and turn structure is related to patient centeredness in Primary Care

Primary Care Hypertension Visits.

Table 4: Relationships between dialogue variables and RIAS based measures

| RIAS measures | Speaker turns | Interactivity | Physician turn density | Patient turn density | Physician turn duration | Patient Turn duration | Physician rate of statement delivery | Patient rate of statement delivery | Total physician within-turn talk | Total patient within-turn talk | Visit length |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Patient centeredness | .29* | .30* | -.07 | -.10 | -.26+ | -.30* | .39** | .25+ | .22 | .31* | .16 |

The RIAS constructed variable of patient-centeredness is correlated (in bivariate analysis) with more speaker turns, higher interactivity, shorter duration turns (patient and physician), faster rate of physician and patient statements, and more total patient talk; it is not related to visit length, total physician talk, or turn density for either patient or physician. Roter et al, Pt Ed Cnslng, 2007

# Turn Structure predicts simulated client ratings Primary Care

Table 3: Relationships between dialogue variables and simulated patient ratings

| **Simulated patient ratings** | Speaker turns | Interactivity | Physician turn density | Patient turn density | Physician turn duration | Patient Turn duration | Physician rate of statement delivery | Patient rate of statement delivery |
|---|---|---|---|---|---|---|---|---|
| Physician demeanor | .45**** | .17 | -.10 | -.22 | -.27+ | -.33* | .34** | .14 |
| Nonverbal effectiveness | .19 | .17 | -.19 | -.11 | -.28* | -.25+ | .24+ | .15 |
| Inter-personal satisfaction | .33* | .17 | -.06 | -.04 | -.26+ | -.19 | .37** | .10 |
| Decision-making partnership | .43** | .24+ | -.19 | -.33* | -.35* | -.47** | .38** | .34* |

**** p< .0001; *** p < .001; ** p< .01; * p< .05; + < .10

Roter et al, Pt Ed & Cnslng 2007

# Nonverbal Effectiveness and Satisfaction Genetic Counseling Simulations

Correlations between literacy measures and simulated client ratings

| Literacy measures | Simulated client ratings ($n = 147$) | |
|---|---|---|
| | Nonverbal behavior | Satisfaction with communication |
| *REAL-G variables* | | |
| All REAL-G words | −.05 | −.06 |
| Unique REAL-G words | −.02 | −.05 |
| Mean REAL-G repetitions | −.03 | .00 |
| Ratio of REAL-G words to total transcript words | −.15$^{+}$ | −.18$^{+}$ |
| *Language complexity* | | |
| Average syllables per word | −.07 | −.10 |
| Average words per sentence | −.19$^{*}$ | −.21$^{*}$ |
| Flesch–Kincaid Reading Grade level | −.23$^{**}$ | −.28$^{***}$ |
| Flesch Reading Ease | .21$^{*}$ | .26$^{**}$ |
| % passive sentences | −.24$^{**}$ | −.29$^{***}$ |

Roter et al, Soc Sci & Med, 2007

# Nonverbal Effectiveness and Satisfaction Genetic Counseling Simulations

Correlations between literacy measures and simulated client ratings

| Literacy measures | Simulated client ratings ($n = 147$) | |
|---|---|---|
| | Nonverbal behavior | Satisfaction with communication |
| Syllables/ second | .02 | .00 |
| *Dialogue density* | | |
| Number of turns | .31*** | .35*** |
| Turn density | −.35*** | −.40*** |
| *Interactivity* | | |
| Interactivity (turns/min) | .28** | .30*** |

$^{+}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

# Literacy Demand and Analogue Patient Learning

| | Prenatal Visits (n) | | |
|---|---|---|---|
| | All (309) | Limited Literacy (152) | Adequate Literacy (157) |
| **Genetics Specific Terminology** | | | |
| All REAL-G words | .03 | .02 | **-.16**** |
| Unique REAL-G words | .02 | .07 | -.04 |
| Ratio of REAL-G words to total transcript words | .03 | .02 | **-.11*** |
| **General Language Complexity** | | | |
| Average syllables per word | -.02 | -.04 | -.02 |
| Flesch-Kincaid Reading Grade | -.04 | **-.07** | **.15*** |
| | | | |
| **Dialogue Structures** | | | |
| Syllables/ second | .01 | .03 | 0 |
| **Number of turns** | .03 | .09 | -.03 |
| **Turn density** | -.15 | **-.35***** | .05 |
| **Turn duration** | -.11 | **-.34**** | .13* |
| **Interactivity** | .04 | **.16*** | **-.11+** |
| **% Information Personalized** | .08 | **.18*** | .02 |

Beta coefficients from regression equations using GEE to account for nesting, degree to which AC identified with patient and AC ethnicity Roter et al, Pt Ed Cnslng, 2009

# CONCLUSIONS

Oral literacy burden can be measured and the framework domains have face, concurrent and predictive validity.

Dialogue interactivity is an especially powerful element of the framework. It is related to ratings of satisfaction with verbal and nonverbal communication and, along with contextualized information, appears important for information recall among for low literate learners.

Reduced oral literacy burden carries an informational cost; literate subjects learned less in sessions with term repetition, lower complex language and higher interactivity perhaps because this type of presentation style is less comprehensive and less well organized.

Finally, a broad spectrum of sociocultural and socioemotional factors may also play an important role in patient learning, including anxiety and interpersonal sensitivity.