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Patterns of research utilization among Certified Hand Therapists

Gail N. Groth, PhD, OTR, CHT^{a,*} and Dorothy Farrar-Edwards, PhD^b

^a Department of Orthopedics & Hands, UW Hospitals and Clinics, Madison, WI, USA

^b Program in Occupational Therapy, Department of Kinesiology, University of Wisconsin-Madison, Madison, WI, USA

Abstract

Study design—Mixed methods, cross-sectional.

Introduction—Nearly 30% of Certified Hand Therapists rarely or never use research findings when treating carpal tunnel syndrome.

Purpose of the study—To identify groups of CHTs with common research utilization patterns.

Methods—National randomized mail survey of 600 CHTs ($n = 308$, RR = 55%). Latent class and thematic analysis of eight questions assessing research use and beliefs.

Results—Four groups of CHT research users were identified: *Analytic* ($n = 135$, 45%); *Skeptic* ($n = 65$, 22%); *Pragmatic* ($n = 53$, 18%); and *Traditional* ($n = 46$, 15%). Highest research use was reported among Analytics and Pragmatics although Sceptics willingly relied on research evidence when it contradicted other sources of knowledge. Age, not experience or population density, was a significant covariate of group membership.

Conclusions—Empowering CHTs to use research findings by increased understanding of their group membership, and understanding others' groups, may increase progress toward evidence-based practice.

Keywords

Research utilization; Evidence-based practice; Carpal tunnel syndrome

Evidence-based decisions occur when research findings are integrated into the cognitions and conversations between patients and hand therapists. Vital to the delivery of high-quality rehabilitation, it is increasingly imperative for hand therapists to use research evidence for clinical decisions. Medicare, arguably the largest healthcare payer in the world, uses evidence-based guidelines for establishing reimbursement and healthcare coverage.¹ Failure to make evidence-based decisions gives rise to undesirable disparities in healthcare delivery. These disparities have been documented across many areas of rehabilitation.^{2,3} Many leaders in hand therapy—MacDermid, Jansen, Valdes, Szabo, LaStayo to name a few—have

eloquently described the vision and process of evidence-based decisions for hand therapists in a series of articles and invited lectures over the past decade.^{4–8}

Despite the imperative for evidence-based decisions, many healthcare professionals, including hand therapists, do not use research findings for clinical decisions at an optimal level. The scope of this problem is alarming with as many as 30–40% of rehabilitation patients not receiving care according to current scientific evidence.^{9–11} Similar findings have been reported among nurses,¹² pharmacists,¹³ physicians,¹⁴ and dentists.¹⁵ Furthermore, very little guidance is available to clarify why healthcare professionals do or do not use research findings for clinical decisions. This gap in the literature may be a result of embracing variable-centered approaches rather than person-centered approaches.

Person-centered approaches differ from the more typical variable-centered approach in several ways. Person-centered approaches focus on relationships among individuals with the goal of identifying unique groups of individuals who share similar response patterns. Within these approaches, each person is considered to be statistically independent and there are no dependent variables. Examples of person-centered approaches include latent class analysis,^{16–18} cluster analysis,¹⁹ and growth mixture models.²⁰ In contrast, variable-centered approaches focus on relationships among variables with the goal of identifying associations, differences, and predictors of independent and dependent variables. Examples of variable-centered approaches include univariate analyses (means, standard deviations), bivariate analyses (correlation, regression) and multivariate analyses.

A number of studies have used a person-centered approach in order to identify research utilization styles among physicians and therapists. For example, Wyszewianski and Green^{21,22} identified four practice styles characterizing response patterns to new research findings among physicians. These styles have been shown to strongly affect response to treatment guideline implementation strategies.²³ Within rehabilitation, Korner-Bitensky et al²⁴ and Hadouda et al²⁵ examined the prevalence of these same practice styles and their associations with practice behaviors. However, it is unknown whether unique groups exist among hand therapists—or, if so, how many groups. Furthermore, these practice styles were theoretically derived and have not been empirically tested.

Identifying unique research utilization styles of hand therapists has important implications for rehabilitation practice. An improved understanding of styles may help to clarify the characteristics of hand therapists who do or do not use research findings for clinical decisions. This knowledge could then be very useful in the development of tailored strategies to facilitate evidence-based decisions.

In order to provide necessary structure for the cognitions surrounding research utilization, carpal tunnel syndrome (CTS) was selected as a context for this study. A diagnostic structure is essential to link research utilization to clinical decision-making. Without a diagnostic structure it cannot be assumed therapists consider similar clinical decisions. CTS is a common clinical condition that presents a small number of homogenous treatment decisions, easing the task of study. A deeper understanding of how therapists use the

findings from CTS studies may increase our ability to translate this knowledge to more complex or diverse clinical decisions in future research.

There is no literature that has utilized a person-centered approach to study research utilization among hand therapists. Therefore, the purpose of this mixed methods explanatory study was to use a person-centered approach to identify groups of Certified Hand Therapists sharing similar research utilization patterns and beliefs. Specifically, the study aims were to: (1) identify and measure the number of latent groups of CHTs; (2) estimate the prevalence of the CHT groups; (3) explain CHT group profiles; and (4) determine if age, experience or population density would predict group membership. Qualitative analysis was used to explain and further interpret the results of the quantitative data analysis.

Methods

Sample size

A random sample of 600 CHTs was drawn from the population of 4819 CHTs in 2008. This sample size was based on an a priori power calculation for a structural equation modeling analysis using this data. The calculation indicated 95–225 cases would be sufficient to demonstrate 80% power at an alpha of 0.05 in combination with the assumption of a 50% response rate.

Survey development

Conceptual development of the survey occurred in six distinct phases: item identification, cognitive interviewing, second round of item identification, survey procedures, second round of cognitive interviewing and, finally, online distribution. Iterative revisions of the survey instrument occurred with each wave of pilot testing. Through this iterative process, the face and content validity of the survey instrument were established.

Item identification

An extensive search of the rehabilitation, nursing, medical and organizational theory literature failed to identify a satisfactory survey instrument. However, many existing individual items from multiple surveys were identified to measure the constructs of this study. No satisfactory measures of rehabilitation research utilization were identified. The search for an existing research utilization measure was broadened to nursing and other fields outside of rehabilitation. Research utilization was initially measured with a series of questions measuring instrumental, conceptual, persuasive and overall research utilization.²⁶ Existing items were also used to measure the construct of belief suspension.²⁷ New items were developed to measure demographics.

Cognitive interviewing

Cognitive interviewing was used to identify and correct problems with survey questions.²⁸ Types of problems revealed during cognitive interviews include difficulties with comprehension, memory recall, social desirability and response options. Two common techniques used with this method are think-aloud interviewing (respondent driven) and verbal probing (interviewer driven).

For the first phase of cognitive interviews a think-aloud technique was used to understand CHTs responses to the questions regarding research utilization. Eight CHTs representing each region of the United States with expertise in the area of CTS rehabilitation agreed to be interviewed. In this early version, research utilization was measured with Estabrooks' four measures of instrumental, conceptual, persuasive and overall research utilization.²⁶ Results from this round of cognitive interviews showed that this presentation of research utilization was confusing to CHTs. The concept of persuasive research utilization was particularly challenging. Overall research utilization was the only type of research utilization that seemed to generate satisfactory comprehension. All respondents confirmed the choice of CTS as a useful and plausible diagnosis to study.

Second round of item identification

Another literature search was conducted to identify a more acceptable measure of research utilization for rehabilitation practitioners. The Research Utilization Index from the Conduct and Utilization of Research in Nursing Project was selected for pilot testing.²⁹ This index was slightly modified for this population to accommodate advances in survey methodology (addition of a time frame and a diagnostic context). *Overall* research utilization was retained as a measure.²⁷ Attention was also paid to social desirability problems given the current social climate surrounding EBP. Therapists who reported low research utilization (a potentially socially undesirable response) were forthcoming with their responses and when specifically probed, did not communicate discomfort or hesitation regarding their low research utilization. It was felt that satisfactory measurement of research utilization was achieved.

Survey procedures

Following development of the preliminary survey, procedural aspects of the survey were tested. A survey research methodologist reviewed the questionnaire. Many revisions and additions were made. For example, reference timeframes and navigational statements were added, response options were changed from bipolar to unipolar responses (following current best knowledge on effective survey question procedures) and additional constructs were added to be analyzed in future work.

Second round of cognitive interviews

Verbal probing techniques were used to understand CHTs responses to all aspects of the survey (i.e. questions and procedures). Survey booklets were printed and mailed to a different group of seven CHTS from around the United States. Thirteen hours of telephone and face-to-face interviews were conducted. Examples of probes include: 'what does the term *using research findings* mean?'; 'I noticed you hesitated before you answered—what were you thinking about?'; 'how did you remember that?'; 'how sure of your answer are you?'; 'do you have a particular case in mind?' Again, significant changes were made to wording, time frame, response labels, response scales and the measurement of research use and intention.

Online distribution

Satisfied with the multiple rounds of item selection, cognitive interviews and expert opinion, one additional step was taken to maximize face and content validity of the instrument. An online version of the survey was developed on WebSurvey, a university-affiliated software program. The survey was launched to the whole population of CHTs ($n = 4819$). The survey was distributed anonymously, sent through email invitation by the Hand Therapy Certification Commission, Inc. (HTCC) in December 2008. A reminder email was sent one month after the initial launch. The survey was closed in January 2009. Data analysis included descriptive statistics of demographics and missing data patterns and examination of the narrative final comments.

Survey distribution

The final survey instrument was mailed to a random sample of 600 CHTs using the five-point contact method of Tailored Design: pre-survey notification letter; first survey mailing; reminder postcard; second wave survey mailing; final contact (mode change to email invitation).³⁰ The final contact was made to every nonrespondent ($n = 126$) with an available email address ($n = 63$). Data collection occurred over a three-month period in the spring of 2009. Respondents were excluded if they did not treat a client with CTS in the last 12 months, if they reported completing the online version and if less than 50% of questions were answered. The University of Wisconsin Social Sciences Institutional Review Board approved all study procedures.

Measurements

Eight items from the larger survey were used within this study and measured the two constructs of *research use* and *belief suspension* (see Table 1). Research use was measured with five items adapted from the Conduct and Utilization of Research (CURN) study²⁹ and was scored on a 7-point Likert scale (*never to all the time*). Minor adaptations to the CURN questions were made—nursing to an OT and PT population; time frame addition; and added a specific context. Reliability (internal consistency) was deemed sufficient ($\alpha = 0.87$), validity was not reported in the initial nurses study.²⁹ Cognitive interviewing established face and content validity for this study. *Belief suspension* was measured with three items from Estabrook's Research Utilization Survey²⁷ scored on a 5-point Likert scale (*not willing at all to extremely willing*). Reliability (internal consistency) was deemed sufficient ($\alpha = 0.87$), validity was not reported. Cognitive interviewing established face and content validity for this study. We collapsed research use responses into dichotomous variables with 4–7 indicating high research use and 1–3 indicating low research use. Similarly, we collapsed the belief suspension responses into dichotomous variables with 3–5 indicating high *belief suspension* and 1–2 indicating low *belief suspension*.

Demographic variables included *age*, *gender*, *years of general clinical experience*, *discipline* (OT and PT), *education* (bachelors, masters, and doctorate), *ownership of practice* (hospital based, therapist owned, physician owned, corporate owned, and other), and *population density* (rural, suburban, and urban).

Qualitative data were obtained from a *Final comments* section at the end of the survey. Data were entered verbatim into an Excel file.

Data analysis

Latent class analysis was used to evaluate possible groups (i.e. classes) of CHTs based on the variables of *research use* and *belief suspension*. A latent (i.e. unobserved) class, characterized by a pattern of conditional probabilities, indicates the chance that variables take on certain values. Each latent class has a distinct profile of probabilities, indicating a unique profile of CHTs. Comparisons between different latent class analysis models are made using rigorous fit statistics to determine the most appropriate model. Latent class analysis is an interdependence technique: it makes no distinction between independent and dependent variables.

MPlus V6.1³¹ with maximum likelihood estimation was used for estimating models to fit the data. A combination of statistical fit criteria was used, including Bayesian Information Criterion (BIC),³² Akaike Information Criterion (AIC),³³ likelihood ratio chi-square, and entropy. Lower BIC and AIC values indicated better fit. Non-significant chi-square values and higher entropy values indicated better fit with less classification error. Assumptions of local independence, or assumptions that observed variables were uncorrelated within each class, were evaluated by examining the correlations between residual covariances for observed indicators.

As part of the model-fitting process, covariates (*age, experience, population density*) were added to estimate the effects of these variables on class membership. Significant covariates with the latent classes ($p < 0.05$) were included in the final best-fit latent class model.

A series of preliminary analyses were conducted to assess representativeness of the data. Risk of systematic bias was assessed in three ways: selection bias, nonresponse bias and respondent bias. Selection bias occurs when the sample is unrepresentative of the population. Nonresponse bias occurs when those who do not respond to the survey differ in important ways from those who respond. Respondent bias occurs when those who do respond to the survey differ in important ways from the population. Each type of bias was tested using chi-square tests to determine differences between the groups on the variables of discipline and geographical region.

Missing data analysis was conducted to determine if missing data were missing completely at random (MCAR), missing at random, or not missing at random. One important assumption of modeling is that data are MCAR. Missing data were analyzed by case, by variable, and, in some instances, manual examination of the original survey.

All analyses were performed at the level of the individual. Therefore no effort was made to control for or identify multiple therapists from the same clinic.

Subject ID number separated qualitative data from the Final Comments section into the latent classes. Illustrative quotes were identified for each latent class. In-depth coding was not performed on the qualitative data.

Results

Preliminary analyses

No detection of systematic bias was noted among the sample, respondents and non-respondents on the variables of discipline and geographic region (Table 2). The study and respondent sample are considered to be representative of American CHTs.

Missing data analysis

Case analysis showed 267 (87%) of cases had less than 5% missing data; 14 (4%) of cases were missing 5–10% of data; 17 (5%) of cases were missing 10–20% of data; 8 (3%) of cases were missing 20–30% of data; and 2 (0.6%) of cases were missing >30% of data. Variable analysis showed 61 (87%) had <5% missing data; 8 (11%) had 5–10% missing data; 2 (3%) were missing >10%. No patterns of missingness were visually noted and data were determined to be MCAR.

Description of sample

Participants included in the analyses were 308 CHTs (response rate of 55%). See Fig. 1 for an inclusion flowchart. A summary of the respondent's individual and organizational characteristics is detailed in Table 3. The majority of participants were female ($n = 251$, 82%), OTs ($n = 265$, 86%) with a mean age of 46 ± 8.1 years, and extensive clinical experience ($M = 21 \pm 8.1$ years). Most participants had a bachelor's ($n = 205$, 67%) or master's degree ($n = 90$, 29%).

Quantity of latent groups

Two to five group solutions were evaluated, with a four-group solution providing the best overall fit across a range of information indices (see Table 4). The BIC was the smallest for the four-group solution. We gave the most weight to the BIC, as it is considered the most reliable indicator of true number of classes.¹⁶

Comparative profiles of the four groups

The four groups identified in this analysis were labeled: *Analytic*; *Skeptic*; *Pragmatic*; and *Traditional* research users. We labeled the groups on the basis of CHTs responses to the survey questions. Fig. 2 displays the estimated probabilities for the indicator variables by group. Fig. 3 displays the four groups with explanatory qualitative themes. Explanatory quotes for each of the groups are found in Table 5.

1. *Analytic* research users ($n = 135$, 45% of the total) were the largest of the four groups with high estimated probability ratings for both *research use* and *belief suspension* (Fig. 2 and Table 5). These practitioners frequently served in the role of knowledge creators and brokers, and relied on research findings as a source of knowledge for practice. They were the most analytic of the groups.
2. *Skeptic* research users ($n = 65$, 22% of the total) were practitioners with low estimated probability ratings for *research use* and high probability ratings for *belief suspension* (Fig. 2 and Table 5). They were among the least likely to use research

as a source of knowledge for carpal tunnel syndrome practice decisions yet most willing to rely on research when it conflicted with other sources of knowledge (i.e. textbooks, colleagues, experiences). These practitioners preferred filtered research results through continuing education and opinion leaders. They did not readily adopt new findings.

3. *Pragmatic* research users ($n = 53$, 18% of the total) were practitioners with high estimated probability ratings for *research use* yet low probability ratings for *belief suspension* (Fig. 2 and Table 5). These individuals were among the most likely to use research results in their practice, yet unwilling to change their practice when research findings conflicted with other sources of knowledge (i.e. textbooks, colleagues, experiences). These individuals were sensitive to the pragmatic issues of clinical decisions.
4. *Traditional* research users ($n = 46$, 15% of the total) were practitioners with low estimated probability ratings for both *research use* and *belief suspension* (Fig. 2 and Table 5). They were among the least to frequently use research and acknowledged a willingness to draw on a wide variety of knowledge sources to inform clinical practice. These CHTs were, on average, the youngest with the least amount of experience.

Further group characteristics

To examine the significance of select variables on latent class membership, a separate set of models with covariates was estimated. Age was the only covariate included in the final model as it lowered the BIC scores the most (2754 from 2795). As age increases, the probability of belonging in the Traditional group decreases and the probability of belonging in the Pragmatic group increases (see Fig. 4). Age did not affect the probability results of belonging in the Skeptic or Analytic groups. The addition of experience and population density did not improve the fit of the statistical model as measured by the BIC scores.

Qualitative themes

Two similar themes were noted in the final comments of the respondents: *rarity of diagnosis* and *low cognitive demand*. Both themes negatively affected research use and were consistently noted across all four latent groups. See Table 4 for explanatory quotes.

Rarity of diagnosis

Conservative management of patients carpal tunnel syndrome was a diagnostic condition rarely seen by hand therapists in this sample. This theme was surprising, as therapists have previously indicated cumulative trauma disorders as a high priority on the research agenda of the American Society of Hand Therapists.³⁴

Low cognitive demand

Clinical decisions regarding carpal tunnel syndrome were perceived to be straightforward and non-demanding. The implication seemed to be that research evidence was not for mundane decisions but rather to resolve more complex clinical dilemmas or poor outcomes.

Discussion

Four groups of CHT research users were identified through latent class analysis by using self-report measures of *research use* and *belief suspension* and the covariate of *age*. Nearly half of the practitioners surveyed we classified as *Analytic*, a group characterized by high *research utilization*, and a willingness to rely on research findings where some findings conflicted with other sources of knowledge (*belief suspension*). The remaining classes were labeled as *Skeptic*, *Pragmatic*, and *Traditional*. Age, but not experience or population density, was a significant covariate of the classes. Highest research use ratings were reported among *Analytics* and *Pragmatics* although *Skeptics* participants willingly relied on research evidence when it contradicted other sources of knowledge. *Traditional*, a class of non-users, had the lowest number of participants among CHTs. The present study is among the first to characterize the attributes of the non-user *Traditional* class and the results highlight the need for further study of this group by investigators in the knowledge translation community. For example, it is often assumed that older clinicians are the least likely to adopt new evidence-based treatment strategies and yet the findings of our study suggest that the opposite is true.

Other investigators have presented typologies of research users. First, Rodgers and the *Diffusion of Innovations Theory*³⁵ identified five adopter categories to explain the process and factors of innovation adoption. Research findings are viewed as innovations. The categories of individuals are innovators, early adopters, early majority, late majority, and laggards. Placement into an adoption category is based on an individuals' opinion leadership in their community, their risk tolerance, length of decision period, and relation to social norms. These categories have enjoyed wide acceptance among sociologists and market analysts.³⁶

Second, Wyszewianski & Green²¹ empirically identified four practice style groups characterizing response patterns to new research findings among physicians. These four groups were *seeker*, *pragmatist*, *traditionalist*, and *receptive*. Group membership was based on three underlying factors of evidence versus experience, practicality, and nonconformity. Generally speaking, a *seeker* independently locates and critically appraises research findings before changing clinical practice, readily discontinues treatment practices when research evidence contradicts experiences, and relies on published data more than experiences or experts. Similarly, the *pragmatist* relies on research evidence to change clinical practice but make practice changes in response to research evidence within the context of competing demands of the clinic (e.g. workload). A *traditionalist* relies on knowledge brokers as a primary source of evidence to advocate for the clinical practice changes. Like the traditionalist, a receptive is open to research evidence and is inclined to change practice but is more likely to rely on knowledge brokers. Wyszewianski & Green (2000) emphasize these groups are general response patterns, stable over time and do not capture states of clinical decision making. The authors used principal components factor analysis to identify these groups. There is some empirical support for these four groups among physicians and occupational and physical therapists.^{22–24} Consistently, *pragmatists* are most prevalent (40–60%) and seekers least prevalent (1–11%) among physicians, occupational and physical therapists.^{23–25}

Two of our groups—*Pragmatic* and *Traditional*—were similar in both name and content to Wyszewianski and Green's practice style groups.^{21–23} Our remaining two groups—*Analytic* and *Skeptic*—shared some similarities with Wyszewianski and Green's *Seeker* and *Receptive* groups (respectfully), although we also found some differences. For example, Explanatory quotes from our *Analytic* group showed that critical analysis, not seeking, more closely described CHTs cognitions. Explanatory quotes from our *Skeptic* group showed reluctance, rather than *Receptive*-ness to research findings. *Skeptics* also share characteristics with the *Late Majority* traits within the Diffusion of Innovations theory.

Although the quantity and profiles identified in this study are similar to previous research results, the prevalence of our group distribution is different. Within our sample of CHTs, the *Analytic* group (45%) is easily the most prevalent group. In contrast, the *Seekers* group (analogous to *Analytics*), ranged from 1–11% of physicians and OT/PT stroke rehabilitation practitioners.^{22,24} Several explanations for this discrepancy across studies include CHTs have obtained advanced certification through a rigorous examination, requiring a deeper knowledge of the research literature and our groups were derived from two psychometrically different factors—research use and belief suspension. In contrast, the practice style traits were derived from three factors.

These results have important implications for multiple stake-holders. Organizations and managers can strategically build healthcare teams to ensure representation of all groups. Professional associations should develop educational curricula customized for each of the groups of learning techniques. Practitioners can self-identify group membership for reflection and professional development.³⁷

Several limitations of this study are noted. Research use and belief suspension were self-reported measurements, and recall bias was a concern. This study was cross-sectional and non-experimental. It is unknown how or whether research utilization and beliefs change over time. This sample size included specialized rehabilitation professionals with more than 20 years of clinical experience, which may limit comparisons to sample sizes that include less experienced therapists, or therapists who are not CHTs. Studying diagnostic conditions other than CTS may change the prevalence or number of groups.

Conclusions

Four groups of Certified Hand Therapists were identified by their method of research utilization and belief suspension. The *Analytic* group identified CHTs who frequently used research results in their practice and was the most prevalent followed by *Skeptic*, *Pragmatic* and *Traditional* labeled groups of research users in this sample. These findings support the theory of identifiable characteristics of CHT research users, and that group membership for *Traditional* and *Pragmatic* groups is influenced by practitioner' age. Future research needs to focus on gaining a deeper understanding of the *Skeptic* and *Traditional* groups, as these are the least likely to incorporate research evidence into their practice. Clinical decisions made by CHTs are not the simple combination of specific values on two dimensions, but rather, CHTs are dynamic information processors with personal experiences and beliefs that lead to a unique cognitive and behavioral signature.

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Fig. 1.
CHT inclusion flowchart.

Fig. 2.

Estimated probabilities of indicators by group membership ($n = 308$). Note: search, evaluate, apply, discontinue, overall = research utilization questions; colleagues, textbooks, experiences = belief suspension questions.

Fig. 3. Groups of CHT research users with explanatory themes ($n = 308$). Note: Vertical axis represents research utilization and horizontal axis represents belief suspension.

Fig. 4.
Estimated probabilities with age as covariate ($n = 308$).

Table 1

Survey instrument: questions used for latent class analyses

Construct	Items	Scoring
Research use	<ul style="list-style-type: none"> • In the last year, how often have you searched research literature in an effort to identify new knowledge for use in treating clients with CTS? • In the last year, how often have you evaluated a research study about CTS to determine its value for practice? • In the last year, how often have you applied knowledge included in the results of research studies about CTS into useful practice activities? • In the last year, how often have you discontinued or rejected CTS practice activities because of knowledge included in the results of research studies? • Overall, in the last year, how often have you used research findings when treating clients with CTS? 	7-point Likert scale—never to all the time
Belief suspension	<ul style="list-style-type: none"> • How willing are you to implement research findings (for any diagnosis, not just CTS) when it contradicts something you learned from your colleagues? • How willing are you to implement research findings (for any diagnosis, not just CTS) when it contradicts something you learned from textbooks? • How willing are you to implement research findings (for any diagnosis, not just CTS) when it contradicts something you learned from your own experience? 	5-point Likert scale—not willing at all to extremely willing
Demographics	<ul style="list-style-type: none"> • In what year were you born? • What is your profession? • What is your highest professional degree? • In what year did you complete your entry-level degree? • In what year did you first become a CHT? • Which of the following best describes the location of the facility in which you perform the majority of your patient care? • What type of organization best describes your clinical setting? 	<p>OT/PT/both</p> <p>Bachelors/Masters/Clinical Doctorate/Research Doctorate/other</p> <p>Rural/suburban/urban</p> <p>Hospital based/therapist owned/physician owned/corporate owned/a combination/I don't know/other</p> <p>Yes/no</p>
Screening eligibility	<ul style="list-style-type: none"> • Have you treated a client with CTS in the last year (conservative management)? (If “No” please return the questionnaire in the enclosed envelope so that we may remove you from our mailing list. You do not have to complete the questionnaire. Thank you.) • Did you recently fully complete this same survey online (within the last 3 months)? (If “yes” thank you for your willingness to participate again. Your input is valuable!) 	

Table 2

Analysis to determine systematic bias

Demographic variables	Selection bias			Nonresponse bias			Respondent bias		
	Sample (<i>n</i> = 600)	Population ^a (<i>n</i> = 2248)	χ^2 <i>p</i>	Respondent (<i>n</i> = 308)	Non-respondent (<i>n</i> = 292)	χ^2 <i>p</i>	Respondent (<i>n</i> = 308)	Population ^a (<i>n</i> = 2248)	χ^2 <i>p</i>
Discipline (%)									
OT	523 (87)	87	1.02 0.31	265 (86)	191 (65)	0.13 0.72	265 (86)	87	0.24 0.62
PT	77 (13)	12		40 (13)	32 (11)		40 (13)	12	
Geographic region (%)									
Midwest	155 (26)	26	6.71 0.24	77 (25)	48 (16)	10.20 0.07	77 (25)	26	8.55 0.13
West	119 (20)	24		63 (20)	54 (18)		63 (20)	24	
South	101 (17)	19		51 (17)	59 (20)		51 (17)	19	
Mid-Atlantic	95 (16)	16		50 (16)	57 (19)		50 (16)	16	
Southwest	71 (12)	8		37 (12)	16 (5)		37 (12)	8	
New England	59 (10)	8		30 (10)	14 (5)		30 (10)	8	

Note: numbers may not add up to 100% due to missing values.

^aPopulation numbers were extracted from percentages provided in the 2007 Salary & Benefits Survey posted at www.htcc.org (*n* = 2248, unknown response rate).

Table 3Demographic characteristics of Certified Hand Therapists by group membership ($n = 308$)

Variables	Overall ($N = 308$)	Analytic (45% $N = 135$)	Skeptic (22% $N = 65$)	Pragmatic (18% $N = 53$)	Traditional (15% $N = 46$)
Age, X (SD)	45.8 (8.1)	45.6 (8.2)	46.3 (8.0)	47.0 (7.6)	43.2 (8.0)
Experience, X (SD)	21.0 (8.1)	20.4 (8.0)	21.7 (8.0)	22.6 (8.5)	19.3 (8.4)
Ownership (%)					
Hospital based	39	38	40	39	35
Therapist owned	25	25	23	25	24
Physician owned	18	19	19	18	26
Corporate owned	10	13	5	10	11
Other	8	6	14	8	4
Population density (%)					
Rural	13	10	12	13	20
Suburban	48	51	47	44	47
Urban	39	39	42	43	33

Note: values are mean (standard deviation) or %. Numbers may not add up to 100% due to missing values.

Table 4

Goodness-of-fit measures and classification quality for models

Groups	Information criterion			Likelihood χ^2			Entropy
	AIC	BIC	Adj BIC	χ^2	df	<i>p</i>	
2	2779	2843	2789	354	238	0.000	0.872
3	2710	2807	2725	267	229	0.040	0.844
4	2664	2795	2684	203	220	0.782	0.816
5	2638	2802	2662	159	210	0.996	0.870

Note: bold text designates the best fitting model. AIC = Akaike information criterion; BIC = Bayesian information criterion; Adj BIC = sample size adjusted Bayesian information criterion.

Table 5

Explanatory quotes by group

Group	Illustrative quotes
Analytic ($n = 135$; 45%)	<ul style="list-style-type: none"> • I use research findings when it is a good study—double blind, sample size, etc. I use old research that has not been disputed. • I like to search databases... A big stopping point is not having free and convenient access to the articles when one is not affiliated w/a university or hospital. • ...I take data presented with a grain of salt. The proof is in the practice.
Pragmatic ($n = 53$; 18%)	<ul style="list-style-type: none"> • [My] treatment approach is very individualized and whole body oriented and therefore difficult to study with evidenced-based methodology. One could say that now I practice results-based therapy. • I have found that so many of the research articles for hand therapy do not change my approach to splinting, pain control, edema control, or home programs for many diagnoses.
Skeptic ($n = 65$; 22%)	<ul style="list-style-type: none"> • I am slow to “jump on the bandwagon” concerning new treatment techniques, especially if they contradict my own experience. • Research methodology sometimes goes over my head, but I do love to read the latest research studies affecting our professional work.
Traditional ($n = 46$; 15%)	<ul style="list-style-type: none"> • I... rely on anecdotal information. • I have a pretty eclectic approach to treating CTS. • Research is often not conclusive, usually suggesting more research needs to be done. • I have been a therapist a long time and remember when I would treat CTS conservatively with 6 wks of phono/ iontophoresis, ROM, massage, splinting, etc. and didn't see good results.
Common themes	
Rarity of diagnosis	<ul style="list-style-type: none"> • We see very little CTS for conservative management. Other diagnoses would push me to do more evidence-based research. • I don't routinely see CTS patients.
Low cognitive demand	<ul style="list-style-type: none"> • Due to limited time and access, I tend to look for current research in areas that tend to have increased complications and decreased results i.e. lateral epicondylitis. • I use EBM for my practice, however, CTS is such a basic topic that I usually do not research it on a regular basis. • I don't consider CTS complex in any way. I get good outcomes. Don't feel I have the need.