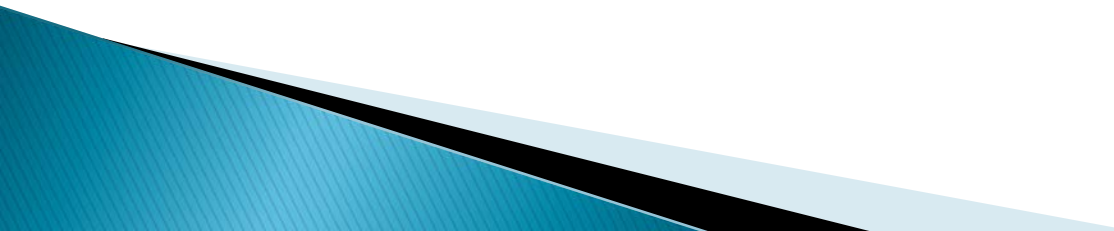# Measuring a Healthy Work Environment in Acute Care Hospital Settings
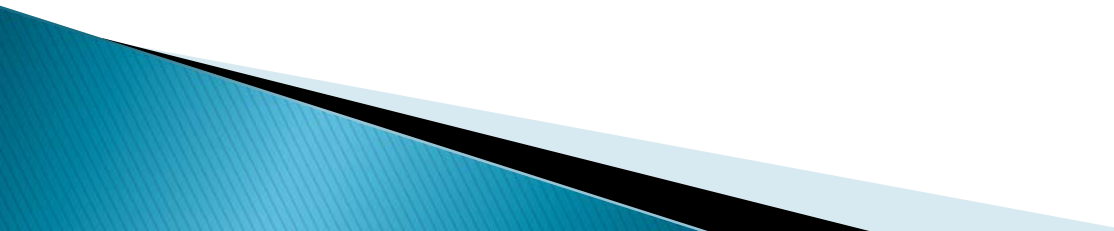
Penny Huddleston, PhD, RN, CCRN
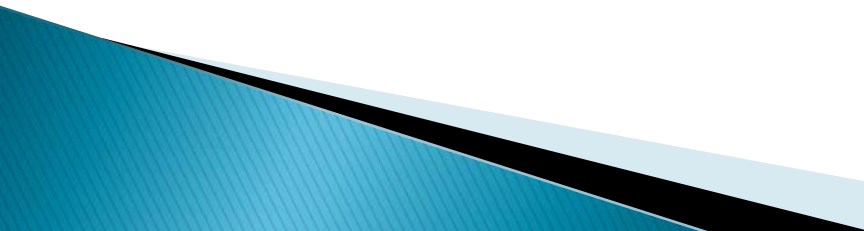
No Disclosures

- Penny Huddleston, PhD, RN, CCRN

- Baylor Scott & White Medical Center Irving

- No sponsorship or commercial support was given to the author

Brain Teaser

❖ **THINK**-about a HWE (How would you define it? What does it mean to you?)

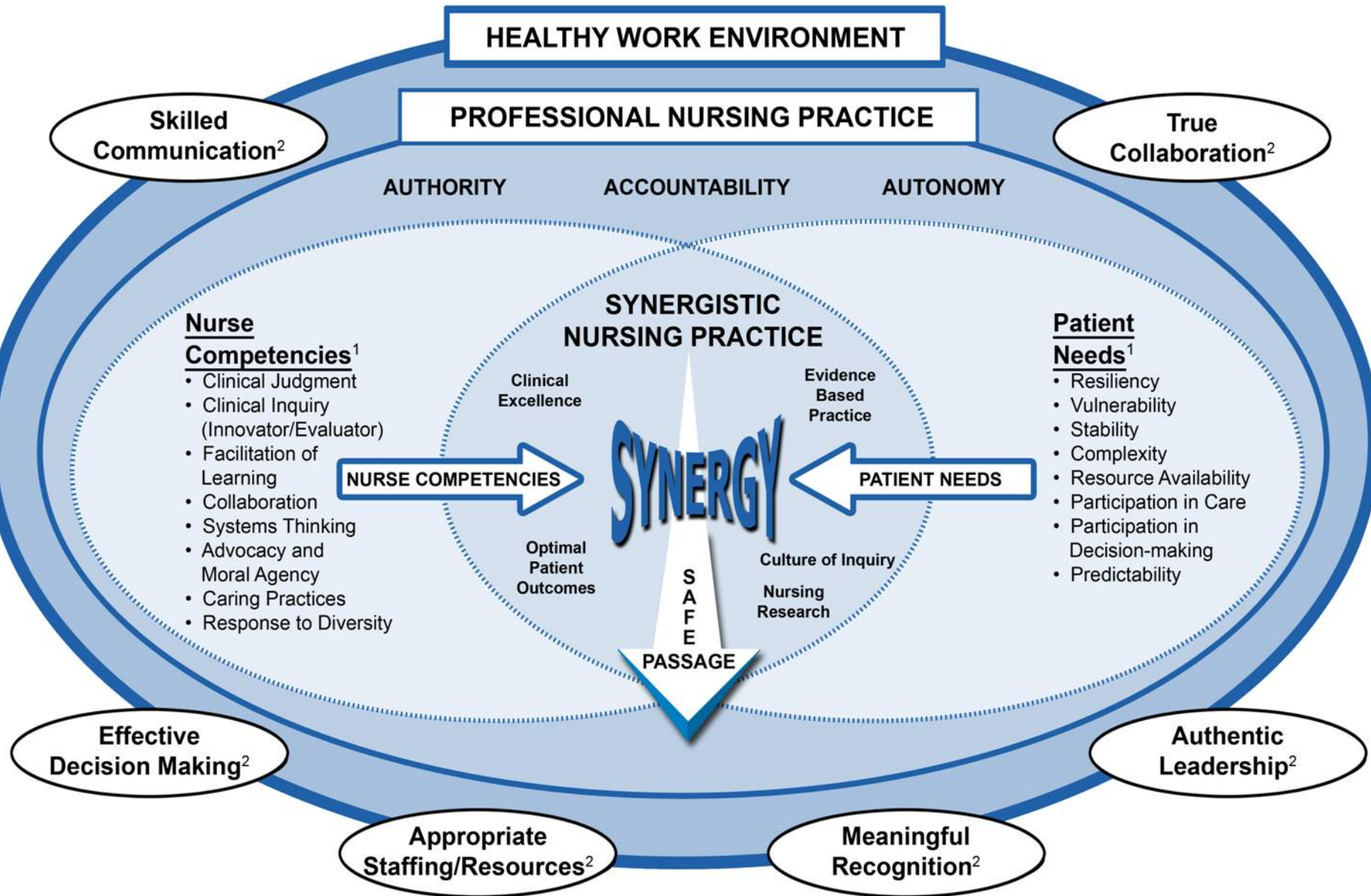❖ **PAIR**-up with another person

❖ **SHARE**-your responses

Background and Significance

❖ Unhealthy work environments lead to medical errors, RN turnover, and higher costs to replace RNs in healthcare setting

❖ Deaths from preventable adverse events estimated between **210,000** and **440,000** annually (James, 2013)

❖ Number of additional RNs needed 439,300 by 2024 (Bureau of Labor Statistics, 2016)

❖ Cost to replace medical/surgical nurse **$92,000** and specialty nurse **$145,000** (Juraschek et al., 2012; Sredl & Peng, 2010)

❖ Healthy work environments (HWEs) may lead to better patient and nurse outcomes, and retention of RNs (Aiken et al., 2002; Kramer & Schmalenberg, 2008; Ritter, 2011)

Framework

❖ Donabedian's model of structures, processes, and outcomes

❖ Kanter's theory of Structural Empowerment

❖ Spreitzer's theory of Psychological Empowerment

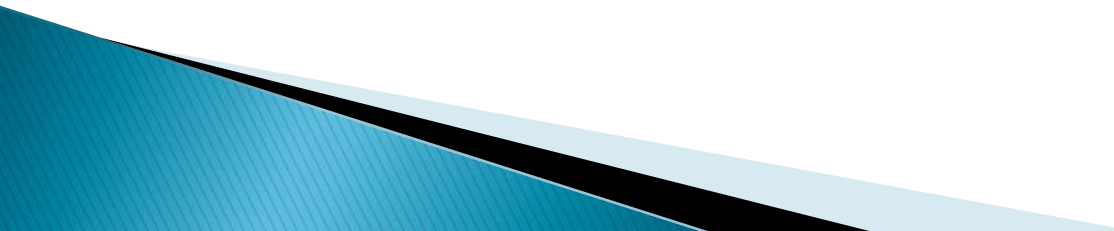❖ Characteristics of a HWE guide the structures, processes, and outcomes

Adapted from Huddleston, 2014

Baylor Health Care System Professional Nursing Practice Model
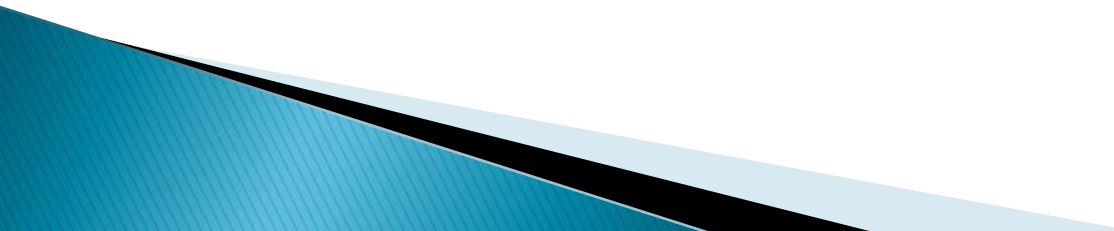
HEALTHY WORK ENVIRONMENT

Skilled Communication[2]

PROFESSIONAL NURSING PRACTICE

True Collaboration[2]

AUTHORITY   ACCOUNTABILITY   AUTONOMY

SYNERGISTIC NURSING PRACTICE

Nurse Competencies[1]
- Clinical Judgment
- Clinical Inquiry (Innovator/Evaluator)
- Facilitation of Learning
- Collaboration
- Systems Thinking
- Advocacy and Moral Agency
- Caring Practices
- Response to Diversity

Clinical Excellence

Evidence Based Practice

NURSE COMPETENCIES → SYNERGY ← **PATIENT NEEDS**

Optimal Patient Outcomes

Culture of Inquiry

Nursing Research

S A F E PASSAGE

Patient Needs[1]
- Resiliency
- Vulnerability
- Stability
- Complexity
- Resource Availability
- Participation in Care
- Participation in Decision-making
- Predictability

Effective Decision Making[2]

Authentic Leadership[2]

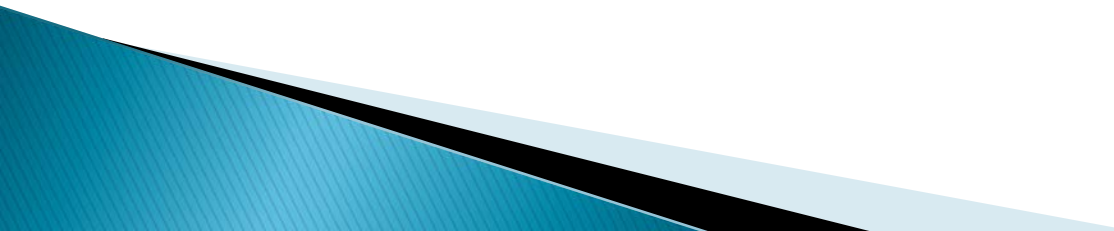**Appropriate Staffing/Resources[2]**

Meaningful Recognition[2]

Purposes of Part 3 Studies

❖ To develop Healthy Work Environment Scale for Direct Care Nurses (HWES for DCNs) and HWES for Nurse Leaders (HWES for NLs) in formal positions

❖ To assess validity and reliability of HWES for Direct Care Nurses and HWES for Nurse Leaders

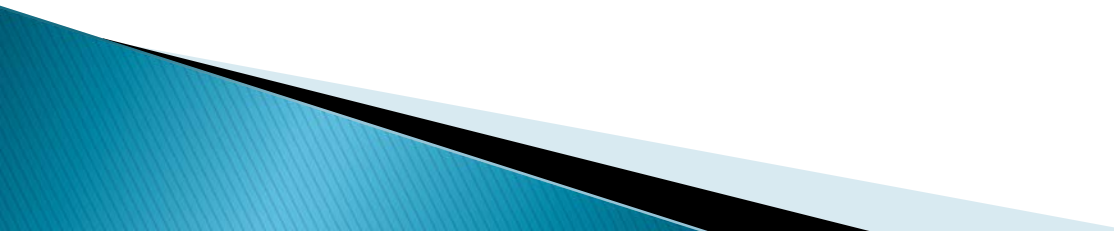❖ To describe direct care nurses' and nurse leaders' perceptions of a HWE

Research Questions

❖ What were the psychometric properties of the HWES for DCNs used to assess the work environment in acute care settings?

❖ What were the psychometric properties of the HWES for NLs used to assess the work environment in acute care settings?

❖ What were the direct care nurses' and nurse leaders' perceptions of a HWE in acute care settings?

Human Subjects Protection

❖ Approval obtained from Baylor Health Care System Institutional Review Board

❖ Approval obtained from University of Texas at Arlington (UTA) Institutional Review Board

❖ Standard processes for human subjects protection were used in these studies

Settings

Baylor Scott and White Health (BSWH) North Division

❖ Phase One-conducted with one hospital and the Office of the CNOs

❖ Phase Two-conducted in all hospitals throughout BSWH North Division

❖ Located in the Dallas/Fort Worth area

Subject Demographics for Phase One

Demographic Characteristic	DCN Sample n	NL Sample n
n	n=50	n=32
Females	n=39 (78%)	n=26 (81%)
Mean Age	n=48 (SD 10.02)	n=42 (SD 8.89)
Position	DCN n=43 (86%) Supervisors n=43 (14%)	APRN n=5 (16%) Frontline NM n=9 (28%) Nurse administrators n=10 (31%) Nurse executives n=3 (9%) Other n=5 (16%)
Highest Level Degree	BSN n=28 (56%)	MSN n=12 (39%)
Greatest Number of Years as RN	1 to 5 years n=16 (32%)	11 to 15 n=9 (28%)
Greatest Number of Years on Current Unit	1 to 5 years n=27 (54%)	1 to 5 years n=17 (53%)
Greatest Number of Years at BSWH	1 to 5 years n=27 (54%)	1 to 5 years n=11 (34%)

Procedures for Phase One

Face Validity

❖ Assigned items to one of eight characteristics of a HWE

Content Validity Indices

❖ Used Lynn's (1986) method of assigning a relevancy score to each item on scale

❖ Ranged from:

   o 1-not relevant, 2-somewhat relevant, 3-quite relevant, or 4-very relevant

Results for Phase One

- HWES for DCNs (version 2)
  - 51 items (v1) 4 items deleted due to face validity
  - 47 items (v2)
  - S-CVI 0.897 or 0.90
  - I-CVI 0.52 to 1.00

- HWES for NLs (version 2)
  - 48 items (v1) 1 item deleted due to face validity
  - 47 items (v2)
  - S-CVI 0.939 or 0.94
  - I-CVI 0.66 to 1.00

- Acceptable criteria for S-CVI 0.90 or higher accepted and I-CVI 0.78 or higher accepted
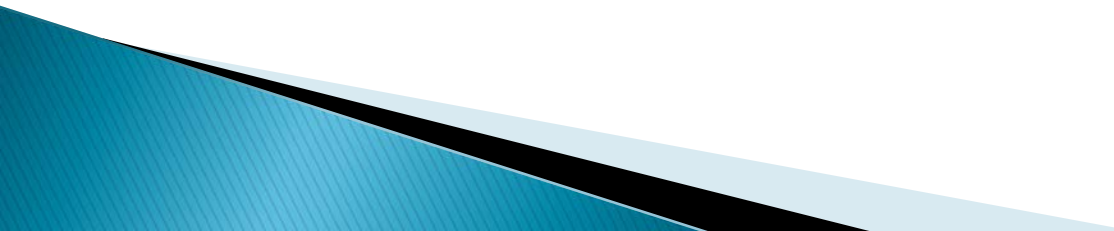
- Items modified or deleted on tools based on I-CVI

Subject Demographics for Phase Two

Demographic Characteristic	DCN Sample n	NL Sample n
n	n=986	n=314
Females	n=884 (90%)	n=286 (91%)
Mean Age	n=41.5 (SD 11.87)	n=48 (SD 9.36)
Position	DCN n=883 (90%) Supervisors n=103 (14%)	APRN n=28 (9%) Frontline NM n=77 (25%) Nurse administrators n=41 (13%) Nurse executives n=12 (4%) Other n=156 (50%)
Highest Level Degree	BSN n=672 (68%)	BSN n=143 (46%)
Greatest Number of Years as RN	1 to 5 years n=267 (27%)	16 to 20 n=55 (18%)
Greatest Number of Years on Current Unit	1 to 5 years n=482 (49%)	1 to 5 years n=147 (47%)
Greatest Number of Years at BSWH	1 to 5 years n=444 (45%)	1 to 5 years n=100 (32%)

Procedures for Phase Two

❖ Subjects received informed consent and link to survey by email

❖ Likert scale
➤ Extent of agreement of observed characteristic in work environment using:
   1-strongly disagree, 2-disagree, 3-agree, or 4-strongly agree

Data Analyses
❖ Continuous variables-calculated mean, standard deviation, range
❖ Categorical variables-calculated percentages and frequencies
❖ Any missing variables recoded as system-missing and deleted
❖ Mean scores and standard deviations-calculated for each HWE characteristic at organizational, entity, and unit levels

Results for Phase Two HWES DCNS & NLS

Direct Care Nurses

- Bartlett's Test of Sphericity *X2=18727.676; df 741; p <.001*
- Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy *0.973*

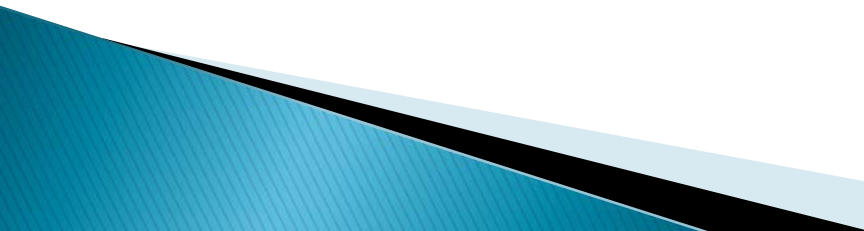**Nurse Leaders**

- Bartlett's Test of Sphericity *X2=9372.944; df 780; p <.001*
- Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA) *0.971*

Bartlett's Test of Sphericity demonstrated significance, KMO and MSA >.70

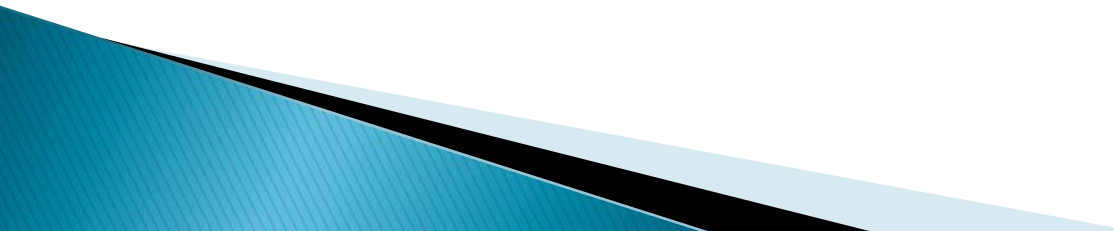Met all assumptions so rejected the null hypothesis and ran PCA

Psychometric Testing

❖ Principal Component Analysis (PCA) determines minimal number of items and simplest structure

❖ Oblique method Promax rotation with Kaiser Normalization

❖ Principal Axis Factoring (PAF) explains common variance from unique variance of item

❖ Items reviewed for correlations of >.40 or higher

SUDOKU

|	8					2		
				8	4		9	
		6	3	2			1	
	9	7					8	
8			9		3			2
	1					9	5	
	7			4	5	8		
	3		7	1				
		8					4	

Methods Used to Identify and Retain Components

- ❖ Kaiser Criterion-loadings with eigenvalues >1

- ❖ Total Cumulative Variance-explains shared variance for each factor in correlation matrix

- ❖ Scree plot-point where curve levels out

- ❖ Visual scan of component matrix for highest loadings

- ❖ Best fit based on statistical criteria, theoretical sense, intuitiveness, and factor interpretability

Components-HWES for DCNs Version 3

| Components	Total Eigenvalues	% of Variance	Cumulative %
1 Authentic Leadership and Meaningful Recognition	15.008	38.483	38.483
2 Effective Decision-making and Skilled Communication	2.360	6.051	44.534
3 Genuine Teamwork	1.357	3.480	48.014
4 Appropriate Staffing	1.260	3.231	51.245
5 Physical and Psychological Safety	1.018	2.611	53.856

Scree Plot-HWES for DCNs Version 3
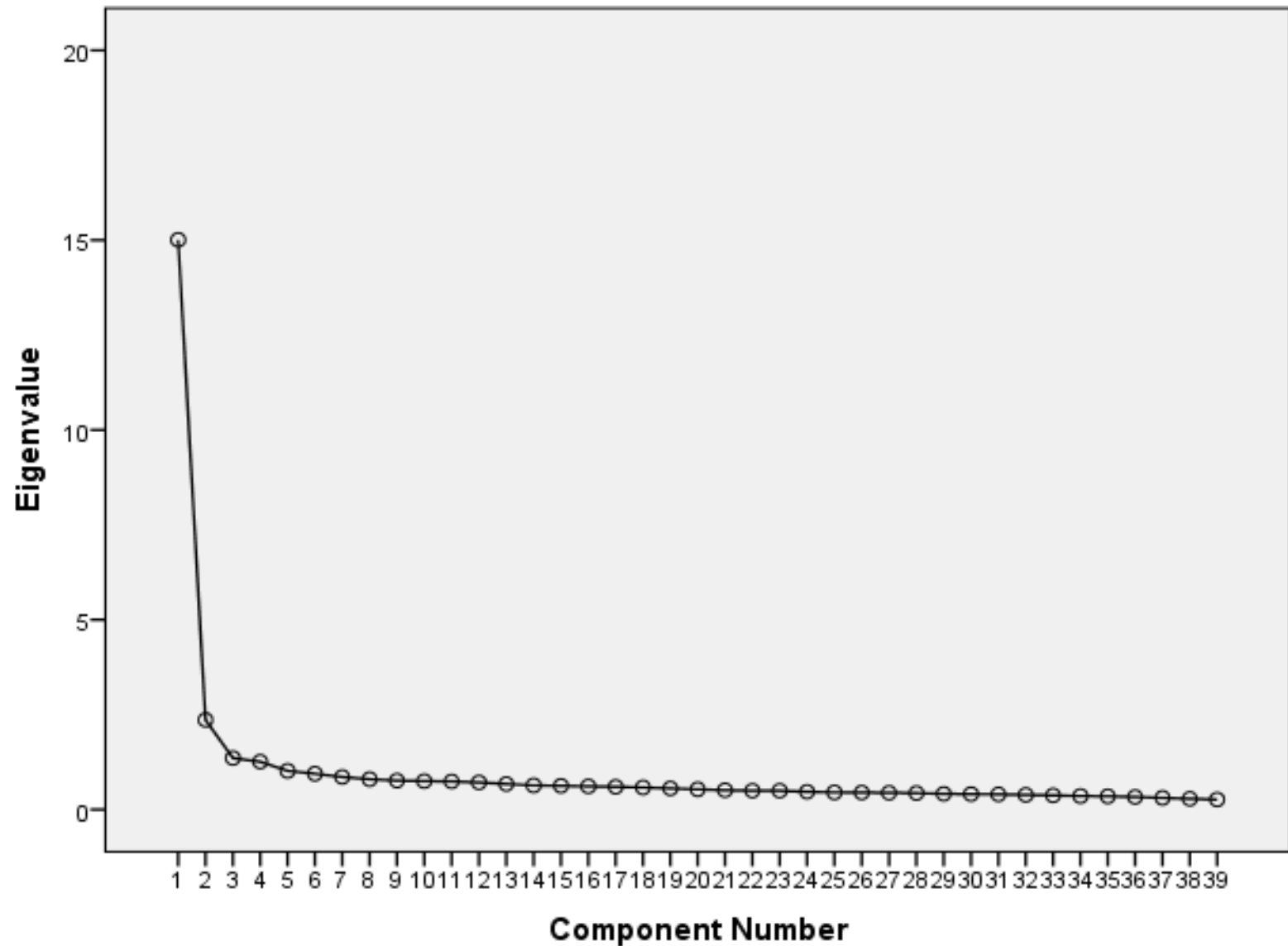
Components-HWES for NLs Version 3

Components	Total Eigenvalue	% of Variance	Cumulative %
1 **Authentic Leadership, Effective Decision-making, Genuine Teamwork, and True Collaboration**	20.466	51.164	51.164
2 **Meaningful Recognition**	2.023	5.057	56.221
3 **Appropriate Staffing**	1.201	3.002	59.223
4 **Skilled Communication**	1.137	2.843	62.066

Scree Plot-HWES for NLs Version 3
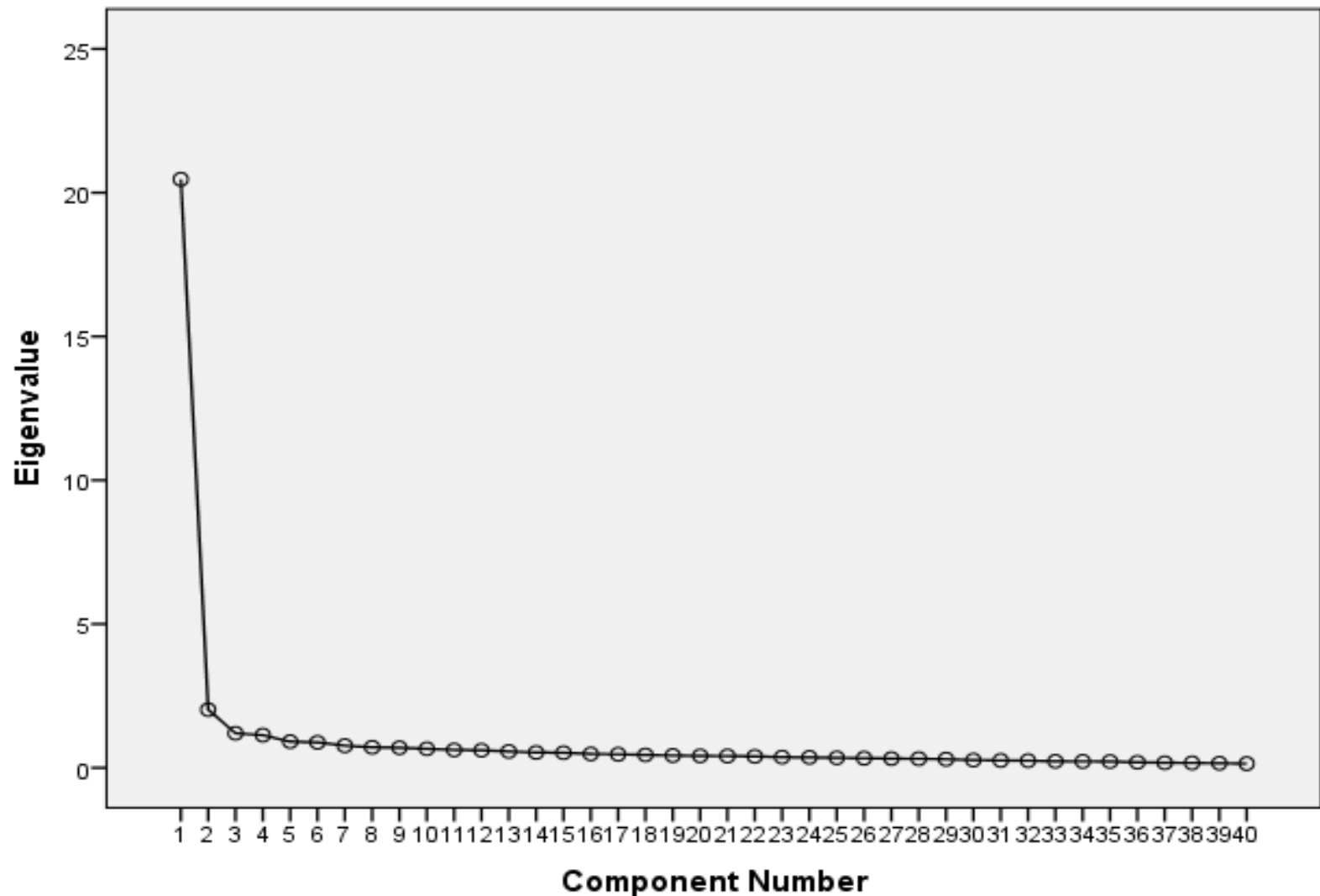
Item Trimming and Item Retention

	Version 1	Version 2	Version 3
Direct Care Nurses	**51** Items 4 deleted	**47** Items 8 deleted	**39** Items Retained
Nurse Leaders	**48** Items 1 deleted	**47** Items 7 deleted	**40** Items Retained
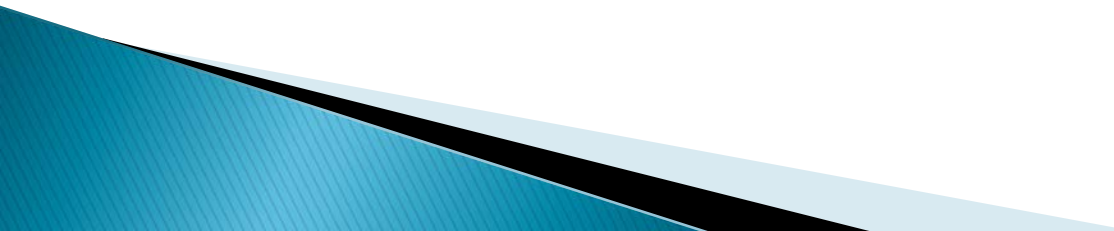
Reliability Testing

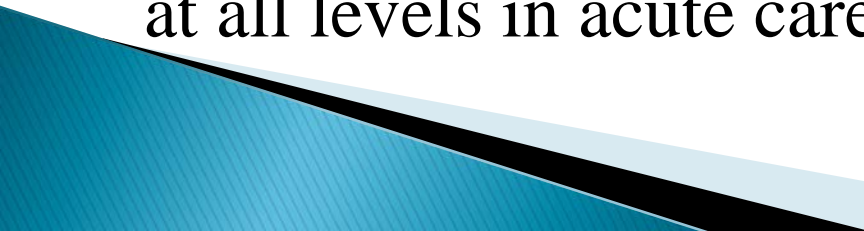| Tools	Mean (SD)	Number of Scale Items	Cronbach Alpha
HWES for Direct Care Nurses Version 3 (N=986)	119.67 (16.239)	39	.957
HWES for Nurse Leaders Version 3 (N=314)	127.74 (18.756)	40	.974

Measuring Perceptions of a DCNs and NLs

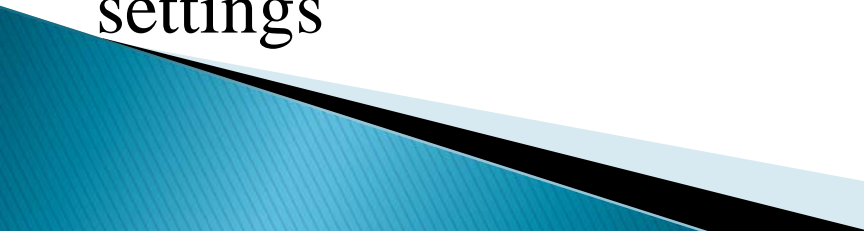| Characteristic	Direct Care Nurses Mean Score (Standard Deviation)	Nurse Leaders Mean Score (Standard Deviation)
Appropriate Staffing	2.96 (0.60)	3.14 (0.55)
Authentic Leadership	3.03 (0.50)	3.28 (0.51)
Effective Decision-making	3.51 (0.43)	3.25 (0.50)
Genuine Teamwork	3.10 (0.46)	3.22 (0.52)
Meaningful Recognition	2.79 (0.59)	2.96 (0.56)
Physical and Psychological Safety	3.08 (0.53)	3.28 (0.51)
Skilled Communication	3.19 (0.38)	3.25 (0.49)
True Collaboration	3.19 (0.43)	3.30 (0.51)

Limitations to Studies

❖ External validity threatened due to studies being conducted in only one healthcare system in Dallas/Fort Worth

❖ Sample size for HWES for Nurse Leaders (314 participants)

Implications to Nursing Practice

❖ Identification of a potential gap in literature

❖ Evidence to nursing community by strengthening psychometric properties of tools

❖ Ability to develop, implement, and measure interventions on work environment

❖ Ability to identify early warning signs when something is wrong in work environment

❖ Ability to improve health of work environment for nurses at all levels in acute care settings

Recommendations for Future Research

❖ Replicate studies
- ➤ Use larger sample size
- ➤ Replicate in different types of hospitals including teaching versus non-teaching, rural versus urban, for-profit versus not-for-profit, and Magnet versus non-Magnet organizations

❖ Conduct interventional studies on individual eight characteristics of a HWE

❖ Examine HWE characteristics in different professions and settings
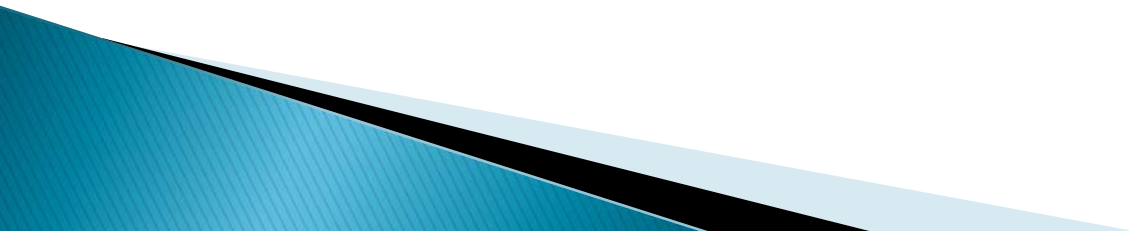
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