

# **AN ASSESSMENT OF THE PSYCHOMETRIC EVIDENCE FROM HOUSEHOLD WORK SATISFACTION OF WOMEN**

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**Abstract:** Psychometrics has been understood as the branch of psychology that deals with the design, administration, and interpretation of quantitative tests for the measurement of psychological variables such as intelligence, aptitude, personality traits. On the other hand, a focus in the literature on determinants of women's health is the cost and benefit of occupying multiple roles as employee, spouse, and mother, yet little attention has been given to the work and home characteristics of different roles for women in paid and unpaid work. The impact of work-home factors on socio-economic gradients in health has also tended to be overlooked. This paper assesses the contribution of work-home factors on socio-economic differences in psychological distress among women. Once the few tools available to measure the *Quality of Household Work (QoHW)* roles do not include psychometric evidence [1], a new instrument to assess all aspects of the *QoHW* and to prove its validity and reliability is of paramount importance. *QoHW* measures initially operated at the quantitative level, specifically measuring the amount of time spent in a role and the number of roles women have, and none to evaluate their degree of satisfaction. The present work seeks to close this gap by introducing an Artificial Intelligence based computer environment that being built according to a cognitive interpretation of the Theory of Coherence [2,3], enables the processing of a series of questionnaires on a range of *HW* topics that pinpoint those the women may enjoy to accomplish and the level of satisfaction with what they are doing [2].

**Keywords:** Household Work Satisfaction of Women, Artificial Intelligence, Knowledge Representation and Reasoning.

## INTRODUCTION

The social norms that underlie behavioral comparisons may come from society as a whole and / or from groups that are closer together and personally known, such as close family members, where a family is viewed as a group of human beings making a social entity and made up of one or more persons living together under a particular setting, with expectations of mutual affection and responsibility and pro term duration [3]. It is characterized by commitment, shared decisions and common goals. Understanding the structure, function, and the course of action of a family are of the utmost importance to contribute to the individual and group well-being. Indeed, countless changes come about in ongoing families, but the most significant one is that of their structure, understood as “an orderly relationship between parts of the family and between the family and other social systems”, promoting its uniqueness [4]. Indeed, in the field of Sociology Talcott Parsons was one that uttered the role of personally and functionally devised individuals, both at the level of family structure and at the level of socialization, suggesting that women are expressions of the role of others, a fact that weigh in the well-being of the social unity [5]. On the other hand, the work of Vivien Burr on gender studies was fundamental to questioning family-related roles that produce, reproduce, and manifest the positions of the genre [6]. In fact, the roles of behavior, duties and expectations correspond to a position of the individual in the social hierarchy. A role is consistent with one’s own behavior, a kind of interaction that creates a specific state of affairs between individuals and different norms, beliefs, and values. This paper identifies four implicit roles on housework, namely physical, emotional, mental and spiritual, integrates housework with care work, includes all those who contribute to household work. Using this

definition of household work would lead to new questions as well as to a reinterpretation of some currently accepted roles in the position of women [4], viz.

*R1 – Spouse, namely as provider or homeowner, is to meet the needs of the family;*

*R2 – Housewife, which is directly related with the later, i.e., taking care of all sorts of household tasks, including housekeeping and gardening;*

*R3 – Childminder, it includes caring for children to meet their needs, namely basic human safety and fun;*

*R4 – Socialization, it aggregates the interaction with other family members and external elements;*

*R5 – Sexuality, which is characterized by a series of actions, such as sharing affection, emotional support, interest in life, intercourse, anything that promotes a satisfying relationship between two partners;*

*R6 – Therapeutic, it includes sharing of concern, willingness to listen to others, active participation in solving problems, and setting emotional support. These include activities that promote good health and prevent disease. R7 – Rehabilitation, in case of illness; and*

*R8 – Recreational, it includes the planning and implementation of recreational activities, leisure activities, parties with family members and outside the family.*

Indisputably, a new tool with evidence for the representation, validity, and reliability of such constructs is therefore needed in order to measure the QoHW of women and to better describe their final outcomes, i.e., the level of satisfaction that they may enjoy. Indeed, this article reports on the results of a study evaluating the psychometric properties of QoHW, including factor structure, internal

consistency, reliability test and validity design. The overall study was based on *Isabel Araújo* work in the development of scales [2]. In particular, one's assessment of the validity of the *QoHW* construct corresponds to the view of *Isabel Araújo* about the construct, which emphasizes the extent to which a new measure provides a theoretically meaningful performance way. It was also assumed that there is a significant correlation between the *QoHW* scale of women and the established measures through questionnaires on *Child rearing, Housewife care, Therapy and Socialization*.

## PRELIMINARIES

*Knowledge Representation and Reasoning (KRR)* practices may be understood as a process of energy devaluation in an open system setting [7]. Indeed, a data item is to be understood as being in a given moment at a particular entropic state as untainted energy which ranges in the interval  $0...1$ ; that according to the *First Law of Thermodynamics* is a quantity well-preserved that cannot be consumed in the sense of destruction, but may be consumed in the sense of devaluation. The focus is not on the value that a given variable may take, but on the work that is done to achieve that value. It may be introduced as, viz.

- *Exergy*, sometimes called available energy or more precisely available work, is the part of the energy which can be arbitrarily used after a transfer operation or, in other words, the entropy generated by it. In Fig.1 it is given by the dark colored areas;
- *Vagueness*, i.e., the corresponding energy values that may or may not have been transferred and consumed. In Fig.1 are given by the gray colored areas; and
- *Anergy*, that stands for an energetic

potential that was not yet transferred and consumed, being therefore available, i.e., all of energy that is not exergy. In Fig.1 it is given by the white colored areas.

These terms refer to all possible processes as pure energy transfer and consumption practices. In order to make the process comprehensible, it is presented in graphic form. Therefore, and in terms of the *ChildMinder Questionnaire-Four-Item (CMQ-4)*, one may have, viz.

Q1 – *Do you usually bathe your children / grandchildren?*

Q2 – *Do you usually feed your children / grandchildren?*

Q3 – *Do you have help in the basic care of your children / grandchildren? and;*

Q4 – *Can you reconcile your profession with child care?*

The purpose of this questionnaire is to assess the general feelings of women regarding their behavioral relationships, assuming that high *ChildMinder* scale's values leads to positive outcomes and benefits. The scale used is an extended version of a Likert-type one, viz.

*strongly agree (4), agree (3), disagree (2), strongly disagree (1), disagree (2), agree (3), strongly agree (4)*

Moreover, it is included a neutral term, *neither agree nor disagree*, which stands for *uncertain* or *vague*. The reason for the individual's answers is in relation to the query, viz.

*As a member of the family, how much would you agree with each one of CMQ – 4 referred to above?, leading to (Table 1).*

Questions	Scale							
	(4)	(3)	(2)	(1)	(2)	(3)	(4)	Vagueness
Q1	x	x						
Q2					x	x		
Q3					x		x	
Q4								x

Leading to
Leading to

Table 1. Woman's answers to CMQ - 4.

Once the input for Q1 closely matches (4) → (3), the system tends to deteriorate, i.e., the input for Q1 (4) → (3) states that there is a tendency to system degradation. The inputs are read from left to right, from (4) → (1) (with increasing entropy), or from (1) → (4) (with decreasing entropy). The markers on the axis correspond to any of the possible scale options, which may be used from bottom → top (from (4) → (1)), indicating that the performance of the system decreases as the entropy increases, or used from top → bottom (from (1) → (4)), indicating that the performance of the system increases as entropy decreases. Table 2 gives an evaluation of the energy consumption per woman with the answers to the questionnaire regarding the best and worst scenarios.

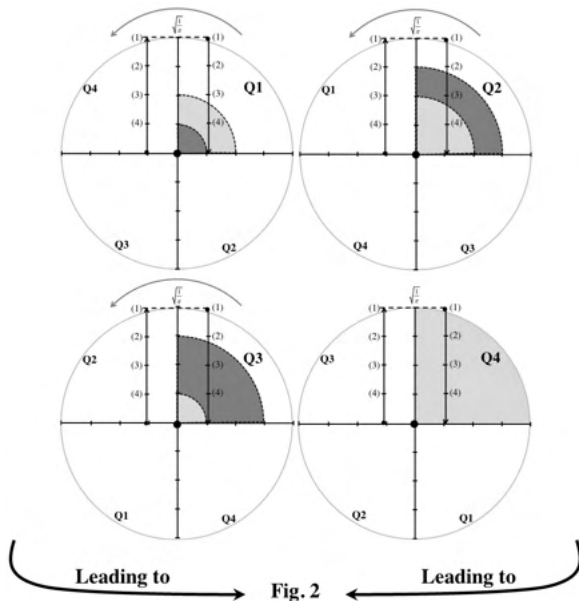


Figure 1. A graphic representation of a woman's energy consumption per answer in the best case scenario

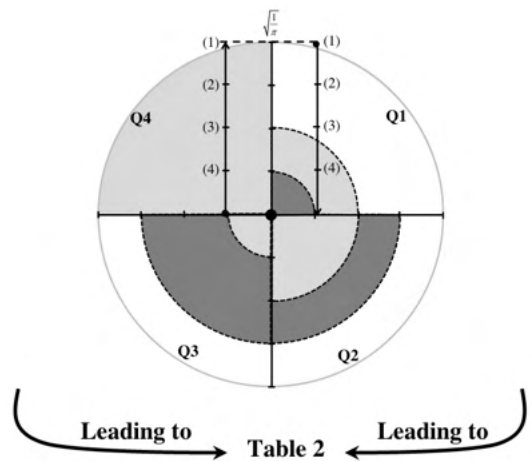


Figure 2. A graphic representation of a woman's overall energy consumption in the best case scenario.

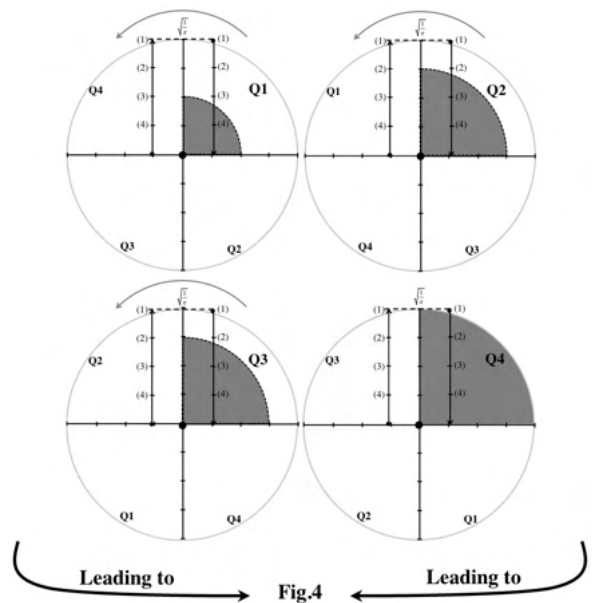


Figure 3. A graphic representation of a woman's energy consumption per answer in the worst case scenario.

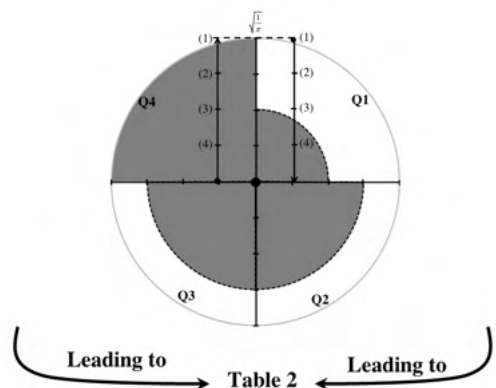


Figure 4. A graphic representation of a woman's overall energy consumption in the worst case scenario.

Questions	Best Case Scenario	Worst Case Scenario
Q1	$exergy_{Q1} = \frac{1}{4} \pi r^2 \Big]_0^{\frac{1}{4}\sqrt{\frac{1}{\pi}}} =$ $= \frac{1}{4} \pi \left( \frac{1}{4} \sqrt{\frac{1}{\pi}} \right)^2 - 0 = 0.02$	$exergy_{Q1} = \frac{1}{4} \pi r^2 \Big]_0^{\frac{2}{4}\sqrt{\frac{1}{\pi}}}$ $= 0.06$
	$vagueness_{Q1} = \frac{1}{4} \pi r^2 \Big]_{\frac{1}{4}\sqrt{\frac{1}{\pi}}}^{\frac{2}{4}\sqrt{\frac{1}{\pi}}}$ $= 0.05$	$vagueness_{Q1} = \frac{1}{4} \pi r^2 \Big]_{\frac{2}{4}\sqrt{\frac{1}{\pi}}}^{\frac{2}{4}\sqrt{\frac{1}{\pi}}}$ $= 0$
	$anergy_{Q1} = \frac{1}{4} \pi r^2 \Big]_{\frac{1}{4}\sqrt{\frac{1}{\pi}}}^{\sqrt{\frac{1}{\pi}}}$ $= 0.23$	$anergy_{Q1} = \frac{1}{4} \pi r^2 \Big]_{\frac{2}{4}\sqrt{\frac{1}{\pi}}}^{\sqrt{\frac{1}{\pi}}}$ $= 0.19$
Q2	$exergy_{Q2} = \frac{1}{4} \pi r^2 \Big]_0^{\frac{2}{4}\sqrt{\frac{1}{\pi}}}$ $= 0.06$	$exergy_{Q2} = \frac{1}{4} \pi r^2 \Big]_0^{\frac{3}{4}\sqrt{\frac{1}{\pi}}}$ $= 0.14$
	$vagueness_{Q2} = \frac{1}{4} \pi r^2 \Big]_0^{\frac{2}{4}\sqrt{\frac{1}{\pi}}}$ $= 0.06$	$vagueness_{Q2} = \frac{1}{4} \pi r^2 \Big]_{\frac{3}{4}\sqrt{\frac{1}{\pi}}}^{\frac{3}{4}\sqrt{\frac{1}{\pi}}} = 0$
	$anergy_{Q2} = \frac{1}{4} \pi r^2 \Big]_{\frac{2}{4}\sqrt{\frac{1}{\pi}}}^{\sqrt{\frac{1}{\pi}}}$ $= 0.19$	$anergy_{Q2} = \frac{1}{4} \pi r^2 \Big]_{\frac{3}{4}\sqrt{\frac{1}{\pi}}}^{\sqrt{\frac{1}{\pi}}}$ $= 0.11$
The rating of Q3 is similar to that of Q2		
Q4	$exergy_{Q4} = \frac{1}{4} \pi r^2 \Big]_0^0 = 0$	$exergy_{Q4} = \frac{1}{4} \pi r^2 \Big]_0^{\sqrt{\frac{1}{\pi}}}$ $= 0.25$
	$vagueness_{Q4} = \frac{1}{4} \pi r^2 \Big]_0^{\sqrt{\frac{1}{\pi}}}$ $= 0.25$	$vagueness_{Q4} = \frac{1}{4} \pi r^2 \Big]_{\sqrt{\frac{1}{\pi}}}^{\sqrt{\frac{1}{\pi}}}$ $= 0$
	$anergy_{Q4} = \frac{1}{4} \pi r^2 \Big]_0^{\sqrt{\frac{1}{\pi}}}$ $= 0.25$	$anergy_{Q4} = \frac{1}{4} \pi r^2 \Big]_{\sqrt{\frac{1}{\pi}}}^{\sqrt{\frac{1}{\pi}}}$ $= 0$

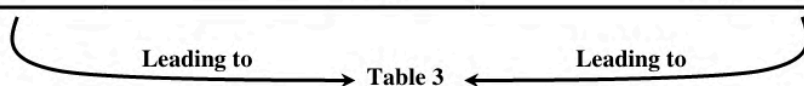


Table 2. Evaluation of the best and worst scenarios.

The data collected above are structured according to the extent of predicate *childminder* (*cmq - 4*), whose abstract view may take the form, viz.

*cmq-4: EXergy, VAgueness, ANergy, System Performance, Quality-of-Information* → {True, False}

The corresponding logical program for the *Best-case* scenario is now given as Program 1, below [8,9,10].

EX	VA	AN	PE	QoI	EX	VA	AN	PE	QoI
BCS	BCS	BCS	BCS	BCS	WCS	WCS	WCS	WCS	WCS
0.10	0.38		0.88	0.52	0.59	0		0.81	0.41

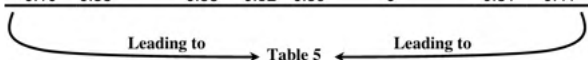


Table 3. The extent of the *cmq-4* predicate in terms of a woman's answer to the *CMQ-4* questionnaire.

where the assessment of *PE* and *QoI* for the various elements forming the *CMQ - 4* are given in the form, viz.

- *PE* is calculated with  $PE = \sqrt{1 - ES^2}$ , where *ES* stands for the exergy value in the best-case scenario (i.e., *ES* = *exergy* + *vagueness*), a value in the range 0 ... 1 (Fig. 3); and

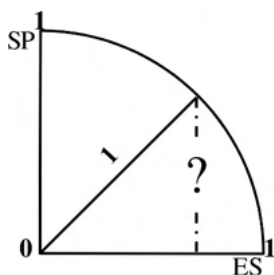


Fig. 4. PE evaluation.

$$PE = \sqrt{1 - (0.10 + 0.38)^2} = 0.88$$

- *QoI* is evaluated in the form, viz.

$$QoI = 1 - \frac{(exergy + vagueness)}{\text{Interval length} (= 1)} = 1 - (0.10 + 0.38) = 0.52$$

**Program 1.** The extent of the predicate *cmq - 4* for the *Best-case* scenario.

```
{
  ¬ cmq - 4 (EX, VA, PE, QoI)
    ← not cmq - 4 (EX, VA, PE, QoI),
      not abduciblecmq-4 (EX, VA, PE, QoI).
  cmq - 4 (0.10, 0.38, 0.88, 0.52).
}
```

## CASE STUDY

A family stands for a social system that consists of one or more persons living together with some expectations of mutual affection, responsibility and temporary duration. It is characterized by commitment, joint decision-making and goal achievement. Looking at the family in this way, one may consider different attitudes and arrangements that exist in today's society. Indeed, understanding its structure, function and procedure is of utmost importance for its characterization and how it may contribute to the well-being of the individual or the group. This understanding will be addressed here in terms of questionnaires to assess *Housewife Household Care, Therapeutic, and Socialization* practices.

## HOUSEWIFE HOUSEHOLD CARE

In the circumstances mentioned above, one can cross gender boundaries and participate in household tasks; one must not rule, one must share. To decide in which extension this is the case, answer questions such as, viz.

- Q1 – Do you usually help with housework?
- Q2 – Do you usually participate in cooking?
- Q3 – Do you iron your clothes? and
- Q4 – Do you usually bring the trash on the street?

once it is of the utmost importance to obtain as much information on the subject as possible. They represent the *Housewife Household Care Questionnaire Four-Item (HHCQ-4)*,

whose answers in terms of qualitative and quantitative values of consumed energy are shown in Tables 4 and 5, respectively.

### THERAPEUTIC

In order to be aware if someone feel happier, more relaxed or to be more healthy, answer questions such as, viz.

- Q1 – Do you usually suggest to your family members to do health surveillance?
- Q2 – When someone complains of some symptoms gives advice to go to the doctor?
- Q3 – Do you care about the health of other family members?
- Q4 – Do you usually do routine appointments and screening tests?
- Q5 – When a family member goes to the doctor, do they usually accompany them? and
- Q6 – Discuss family problems?

once it is of the utmost importance to obtain as much information on the subject as possible. They stand for the *Therapeutic Questionnaire-Six-Item (TQ - 6)*, whose answers in terms of qualitative and quantitative values are shown in Tables 4 and 5, respectively.

### SOCIALIZATION

Socialization is a process that introduces people to social norms and customs, i.e., a person learns to become a member of a group, community or society.

- *Socialization prepares people to participate in a social group by teaching them its norms and expectations;*
- *Socialization has some primary goals, namely teaching impulse control and developing a conscience, preparing people to perform certain social roles or cultivating shared sources of meaning and value; and*

- *Socialization is culturally specific, but this does not mean certain cultures are better or worse than others.*

that make the *Socialization Questionnaire-Four-Item (SQ - 4)*, viz.

- Q1 – Do you maintain close relationships with neighbors?
- Q2 – Do the different family members relate to the neighbors?
- Q3 – Do neighbors often come to your house? and
- Q4 – Do you attend church / religion regularly?

whose answers in terms of qualitative and quantitative values are shown in Tables 4 and 5, respectively.

Questionnaires	Questions	Scale				Vagueness
		(4)	(3)	(2)	(1)	
HHCQ-4	Q1				x	
	Q2		x			
	Q3					x
	Q4					x
TQ-6	Q1					x
	Q2				x	x
	Q3		x	x		
	Q4					x
	Q5					x
	Q6		x	x		
SQ-4	Q1		x	x		
	Q2					x
	Q3		x	x		
	Q4				x	x

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Leading to

Table 4. The qualitative answers of a woman to the HHCQ - 4, TQ - 6 and SQ - 4 questionnaires.

Questionnaires	EX	VA	AN	PE	QoI	EX	VA	AN	PE	QoI
	BCS	BCS	BCS	BCS	BCS	WCS	WCS	WCS	WCS	WCS
CMQ - 4	0.10	0.38	0.90	0.88	0.52	0.59	0	0.41	0.81	0.41
HHCQ - 4	0.28	0.42	0.72	0.71	0.30	0.75	0	0.25	0.66	0.25
TQ - 6	0.34	0.12	0.66	0.93	0.54	0.78	0	0.22	0.62	0.22
SQ - 4	0.14	0.40	0.86	0.84	0.46	0.62	0	0.38	0.78	0.38

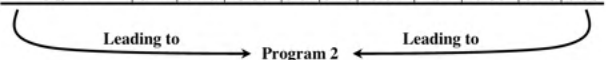


Table 5. The extent of the predicates cmq - 4, hhcq - 4, tq - 6 and sq - 4 gives the quantitative equivalent of the woman answers to the CMQ - 4, HHCQ - 4, SQ - 6 and TQ - 4 questionnaires for the Best and Worst-case scenarios.



## COHERENCE-BASED COMPUTATIONAL AGENCY

One's work that went step-by-step to understand the problem and come up with a solution was possible due to the power of *Computational Logic (CL)* or *Computational Thinking (CT)*, a set of problem-solving methods that involve expressing problems and their solutions in ways that a computer may execute, i.e., it describes the decision-making process used in programming to turn up one's decisions into algorithms. Here it is used deduction, i.e., starting from a conjecture and considering a fixed set of relations (axioms and inference rules), try to construct a proof of the conjecture. It is a creative process. *CL* or *CT* works with a proof search for a defined strategy. If one knows what this strategy is, one may implement certain algorithms in logic and do the algorithms with proof-finding [9].

{

*/\* The following sentence says that the extent of the predicate  $cmq-4$  is based on the explicitly specified clauses and those that cannot be dropped \*/*

$\neg cmq-4(EX, VA, AN, PE, Qol)$   
 $\leftarrow not\ cmq-4(EX, VA, AN, PE, Qol),$   
*not abducible* <sub>$cmq-4$</sub> ( $EX, VA, AN, PE, Qol$ ).

*/\* The following sentence stands for an axiom of  $cmq-4$  \*/*

$cmq-4(0.10, 0.38, 0.90, 0.88, 0.52).$

*/\* The following sentence says that the extent of the predicate  $tq-6$  is based on the explicitly specified clauses and those that cannot be dropped \*/*

$\neg tq-6(EX, VA, AN, PE, Qol)$   
 $\leftarrow not\ tq-6(EX, VA, AN, PE, Qol),$   
*not abducible* <sub>$tq-6$</sub> ( $EX, VA, AN, PE, Qol$ ).

*/\* The following sentence stands for an axiom of  $tq-6$  \*/*

$tq-6(0.34, 0.12, 0.66, 0.93, 0.54).$

*/\* The following sentence says that the extent of the predicate  $rhhcq-4$  is based on the explicitly specified clauses and those that cannot be dropped \*/*

$\neg rhhcq-4(EX, VA, AN, PE, Qol)$   
 $\leftarrow not\ rhhcq-4(EX, VA, AN, PE, Qol),$   
*not abducible* <sub>$rhhcq-4$</sub> ( $EX, VA, AN, PE, Qol$ ).

*/\* The following sentence stands for an axiom of  $hhcq-4$  \*/*

$hhcq-4(0.28, 0.42, 0.72, 0.71, 0.30).$

*/\* The following sentence says that the extent of the predicate  $sq-4$  is based on the explicitly specified clauses and those that cannot be dropped \*/*

$\neg sq-4(EX, VA, AN, PE, Qol)$   
 $\leftarrow not\ sq-4(EX, VA, AN, PE, Qol),$   
*not abducible* <sub>$sq-4$</sub> ( $EX, VA, AN, PE, Qol$ ).

*/\* The following sentence stands for an axiom of  $sq-4$  \*/*

$sq-4(0.14, 0.40, 0.86, 0.84, 0.46).$

}

**Program 2.** The extent of  $cmq-4$ ,  $hhcq-4$ ,  $tq-6$  and  $sq-4$ 's predicates for the *Best-case* scenario.

where  $\neg$  denotes *strong negation* and *not* stands for *negation-by-failure*. It is now possible to generate the data sets that will

allow one to train an ANN (Fig. 5), where the extent of predicates  $cmq - 4$ ,  $tq - 6$ ,  $hhcq - 4$ , and  $sq - 4$  are used to build the input to the ANN, that presents as output an evaluation of the *Psychometric Evidence (PE)* plus a measure of its *Sustainability (QoI)*. With a group of 15 (fifteen) human beings, the ANN training and test sets may be obtained by making the sentence depicted below obvious (i.e., the theme of formal proof in every sense), viz.

$$\forall (EX_1, VA_1, AN_1, PE_1, Qol_1, \dots, EX_4, VA_4, AN_4, PE_4, Qol_4), (cmq-4 (EX_1, VA_1, AN_1, PE_1, Qol_1), hhcq-4 (EX_2, VA_2, AN_2, PE_2, Qol_2), tq-6 (EX_3, VA_3, AN_3, PE_3, Qol_3), sq-4 (EX_4, VA_4, AN_4, PE_4, Qol_4))$$

generate in all conceivable ways all possible sequences that combine the extent of the predicates  $cmq - 4$ ,  $hhcq - 4$ ,  $tq - 6$ , and  $sq - 4$ , resulting in a series of 1365 training and test sets presented in the form, viz.

$$\begin{aligned} & \{ \{ cmq - 4 (EX_1, VA_1, AN_1, PE_1, Qol_1), hhcq - 4 (EX_2, VA_2, AN_2, PE_2, Qol_2), tq - 6 (EX_3, VA_3, AN_3, PE_3, Qol_3), sq - 4 (EX_4, VA_4, AN_4, PE_4, Qol_4) \}, \approx \{ \{ (cmq - 4 (0.10, 0.38, 0.90, 0.88, 0.52), hhcq - 4 (0.28, 0.42, 0.72, 0.71, 0.30), \\ & tq - 6 (0.34, 0.12, 0.66, 0.93, 0.54), \\ & sq - 4 (0.14, 0.40, 0.86, 0.84, 0.46) \}, \dots \} \end{aligned}$$

where  $\{ \}$  is the expression for sets and  $\approx$  stands for itself. With regard to the output of the ANN, the output values include both the *Psychometric Evidence (PE)* and the *Sustainability factors (QoI)*, that are evaluated in the form, viz.

$$\begin{aligned} & \{ \{ PE_{cmq-4} + PE_{hhcq-4} + PE_{tq-6} + PE_{sq-4} \} / 4, \dots \} \approx \\ & \approx \{ \{ (0.88 + 0.71 + 0.93 + 0.84) / 4 = 0.84 \}, \dots \} \end{aligned}$$

and, viz.

$$\begin{aligned} & \{ \{ Qol_{cmq-4} + Qol_{hhcq-4} + Qol_{tq-6} + Qol_{sq-4} \} / 4, \dots \} \approx \\ & \approx \{ \{ (0.52 + 0.30 + 0.54 + 0.46) / 4 = 0.46 \}, \dots \} \end{aligned}$$

With this tool or agency one can study the basics, i.e., focus on the way women think and amending family culture and processes before deciding what to do. What members think about the future of the family will drive their behaviour, not the other way all around.

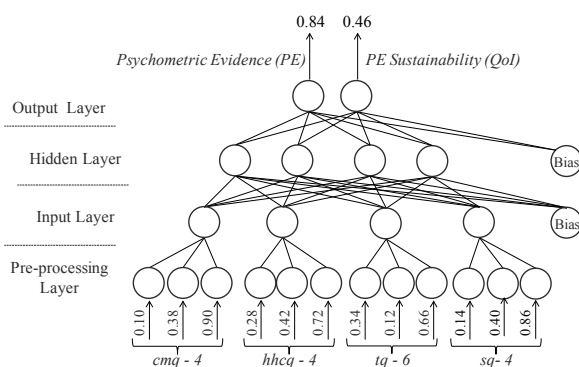


Figure 5. A creative view of the ANN topology for PE assessment.

## CONCLUSIONS

One has to change the way of living, accept new challenges, adapt to new experiences, develop new behavioral, cognitive, and emotional responses. In fact, a human's adaptive performance becomes a key factor in maintaining persistence throughout the *PE (Psychometric Evidence of Women HW Satisfaction)* and the measure of its sustainability, which must be mathematically evaluated and formally substantiated in real time, and given in terms of the *QoI* of the training and test sets. This was the main objective of this work, delivered as a computational agency that integrates the phases of data gathering, anticipating a logic representation of uncertainty and vagueness, plus the stages of data processing and results'

analysis. In the future work, a vision of evaluating the outcome or outcomes should be pursued in the sense of a multi-valued logic, an issue that has only been addressed in general terms, i.e., a narrative about the *HW* women like to do and the level of satisfaction, ranging in the interval 0 ... 1, with what they do.

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## REFERENCES

1. Janzen, B., and Hellsten, L. **Does the psychosocial quality of unpaid family work contribute to educational disparities in mental health among employed partnered mothers?** April 2018 - International Archives of Occupational and Environmental Health 91(S1) DOI:10.1007/s00420-018-1310-y.
2. Araújo, I. **Escala de Avaliação de Papéis Familiares: Avaliação das Propriedades Psicométricas**, em Revista de Enfermagem, número 4 – 2005, ISSN: 2182.2883 é ISSNp: 0874.0283. <http://dx.doi.org/10.12707/RIV14029>
3. Bartz, C. **International Council of Nurses and person-centered care**. International Journal of Integrated Care. 2010;10(5): None. DOI: <http://doi.org/10.5334/ijic.480>
4. Shirley May Harmon Hanson. **Enfermagem de cuidados de saúde à família: teoria, prática e investigação**. Loures: Lusociência, cop. 2005. ISBN 972-8383-83-5.
5. Black, M. **The Social Theories of Talcott Parsons: A Critical Examination**. Prentice Hall, 1961.
6. Burr, V. **Gender and Social Psychology**. Psychology Press, 1998.
7. Wenterodt, T., Herwig, H.: **The Entropic Potential Concept: a New Way to Look at Energy Transfer Operations**. *Entropy* **16**, 2071–2084 (2014).
8. Capita, A., Dias, A., Marques, J., Neves, M., Marreiros, G., Ribeiro, J., Vicente, H., and Neves, J. **Full Informed Digital Transformation, Simpler, Maybe Better**, in Mining Intelligence and Knowledge Exploration (MIKE 2019), December 19-22, NIT, Goa, India. To appear in Lecture Notes in Artificial Intelligence (LNAI) series by Springer Verlag.
9. Fernandes, B., Vicente, H., Ribeiro, J., Capita, A., Analide, C., and Neves, J. (2019). **Fully Informed Vulnerable Road Users - Simpler, Maybe Better**. In The 21st International Conference on Information Integration and Web-based Applications & Services Proceedings (iiWAS2019). ACM, Munich, Germany. <https://doi.org/10.1145/3366030.3366089>.
10. Neves, J., Maia, N., Marreiros, G., Neves, M., Fernandes, A., Ribeiro, J., Araújo, I., Araújo, N., Ávidos, L., Ferraz, F., Capita, A., Lori, N., Alves, V., Vicente, H. **Entropy and Organizational Performance**, in The 14th International Conference on Hybrid Artificial Intelligent Systems (HAIS 2019), September 4-6, 2019, León, Spain. To be published by Springer in its series of Lecture Notes in Artificial Intelligence – LNAI.