

# Developing and Measuring Sub-Dimensions of Cognitive and Emotional Trust in Supervisor

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**Abstract:** This paper built a hierarchical framework of cognitive & emotional trust which is composed of two higher-order constructs and six sub-dimensions. Cognitive trust consists of 1) expectations based on competence, 2) benevolence, and 3) integrity. Emotional trust consists of 1) emotional linkage, 2) identification, and 3) depending willingness. This framework was represented by a second-order factor model and verified by 301 Chinese and 952 Japanese employee samples. In addition, a set of measures were developed to operationalize this framework. The psychometric properties of original measures were validated by both Chinese and Japanese samples.

## 1 INTRODUCTION

In recent year, the role of employees' trust in supervisor has attracted attention, confronted with the increasing uncertainty in business environment. Although prior researches have established some empirical relationships between trust in supervisor and employees' attitudes/behaviors (Dirk & Ferrin, 2002), the theories to explain the influence paths are still lacking. Moreover, there is little cross-national comparative data on trust in supervisor, even though it is largely affected by culture.

For this reason, the Influence of Trust on Work-Related Attitudes and Behaviors (ITWAB) project is carrying out a series of hierarchical cross-national comparison to clarify such influence paths (Liu & Li, 2015b). To accomplish this, we need to systematically conceptualize and operationalize the trust in supervisor under a second-order framework. In an early work (Liu & Li, 2015a), we developed two higher-order constructs in framework and their measures: *cognitive trust in supervisor* (CT): defined as the positive expectations & willingness to be vulnerable based on "the cognition of supervisor's traits;" *emotional trust in supervisor* (ET): defined as the positive expectations & willingness to be vulnerable rooted in "a high-quality long-term relationship with the supervisor." In current paper, we develop CT & ET's six sub-dimensions and sub-scales so as to test the second-order framework with Chinese and Japanese samples.

## 2 THEORY AND HYPOTHESES

Liu & Li (2015a) proposed two theoretical ideas that CT's function is to secure the productivity of social exchange relationship (SER) by focusing on the outcome of exchange from the perspective of "gains and losses;" whereas ET's function is to build up a base of the long-term relationship by focusing on the process of exchange itself from the perspective of "maintaining SER." It is useful to ground the two ideas on Cartwright & Zandler's (1968) classic theory of social power.

The points of Cartwright & Zandler's theory are the *core causation* and *power sources* underlying social power. First, when the supervisor's specific action A causes a change in the state S of an employee, we say "the supervisor *influences* the state S of that employee." And, the supervisor's *social power with respect to S* means that the supervisor *can* influence S of that employee (i.e., the supervisor has capacity to perform A). Thus,  $A \rightarrow S$  is the core causation underlying social power in this definition. Second, such  $A \rightarrow S$  causations are premised on at least two kinds of power sources. One is employee's need bases that can be classified into three groups: Existence, Relatedness, and Growth Needs, according to ERG theory (Alderfer, 1972), as shown in Table 1. The other is supervisor's resource bases defined as the expected value (amount of resource  $\times$  subjective probability) of how

Table 1: The A → S causations & power sources underlying each sub-dimension of CT & ET.

<i>CT's sub-dimensions</i>	<i>Supervisor's resource bases</i>	<i>Concrete A</i>	<i>Specific facets of S (performance, growth, &amp; rewards)</i>	<i>Employee's need bases underlying such facets of S</i>
<b>Expectations based on competence</b>	The expertise, achievements, and personal connections	Efforts to plan the goals/projects which can create chances for employees to grow	The potential level of expertise improvement	Want to improve expertise ( <i>Growth</i> )
			The potential level of career development	Want to achieve a successful career ( <i>Growth</i> )
<b>Expectations based on benevolence</b>	The authority in management	Making managerial decisions that take employees' career development into consideration Making managerial decisions that take the employee's particular circumstance into consideration	The probability of obtaining good chance to grow	Want to grow and achieve a successful career ( <i>Growth</i> )
			The probability of suffering the losses due to weak position	Not want to suffer the losses due to the weak position in hierarchy ( <i>Existence</i> )
<b>Expectations based on integrity</b>	The high morals, and a healthy value system	Always having the good sense to prevent troubles	The probability of suffering the losses due to troubles	Not want to be involved in troubles ( <i>Existence</i> )
	The high consistency	Making decisions and instructing consistently so as not to toss about employees' work life	The probability of time & energy wasting, performance worsening	Not want personal rights and interests to be infringed ( <i>Existence</i> ) Not want to waste time and energy ( <i>Existence</i> )
<i>ET's sub-dimensions</i>	<i>Supervisor's resource bases</i>	<i>Concrete A</i>	<i>Specific facets of S (warmth &amp; happiness in work life)</i>	<i>Employee's need bases underlying such facets of S</i>
<b>Emotional linkage</b>	The emotional tie with the employee	Empathizing the employee (i.e. reproducing his/her emotions) and communicating sincerely with him/her	The pleasure of communication	Want his/her emotions to be understood by the supervisor ( <i>Relatedness</i> )
				Want to be connected emotionally with the supervisor ( <i>Relatedness</i> )
<b>Identification</b>	The unification of the long-term interests, and values with the employee	Considering "what is good for the employee's career?" and backing him/her up from his/her point of view (i.e. reproducing his/her thoughts)	The meaningfulness of the sense of belonging	Want his/her thoughts to be understood by the supervisor ( <i>Relatedness</i> )
	The attractiveness of supervisor's way of thinking and values			Want to belong to a in-group where members have shared the long-term interests and values ( <i>Relatedness</i> )
<b>Depending willingness</b>	The norm of reciprocity according to which supervisor can expect that the employee will give back in future	Cooperating with and taking care of the employee in good faith both officially and privately	The warmth of the relationship rich in mutual obligations	Want to further develop the relationship with the supervisor through deepening obligations ( <i>Relatedness</i> )
	The mutual obligations in the relationship with the employee			

many resources the employee can obtain from the supervisor. Therefore, it is helpful to reveal how CT & ET differ in (1) core causation and (2) the power sources, as shown in Table 1.

Based on Cartwright & Zandler (1968), CT can be regarded as employee's cognition such that "how much social power the supervisor has with respect to the performance, growth, and rewards in my career?" The core causation underlying CT is *the supervisor's actions → performance, growth, and rewards in the employee's career*. The need bases are *existence & growth needs* mainly, and the resource bases are chiefly *the objective resources with general usefulness* (Liu & Li, 2015a; b).

ET, on the other hand, can be considered as employee's sense such that "how much social power the supervisor has with respect to the warmth &

happiness in my work life?" The core causation underlying ET is *the supervisor's actions → warmth & happiness in the employee's work life*. The need bases are *relatedness needs* mainly, and the resource bases are chiefly *the subjective resources with personal happiness* (Liu & Li, 2015a; b).

On the grounds that CT & ET are different in (1) core causation and (2) power sources, it is reasonable to think that:

H1: CT & ET are different kinds of social power.

We first develop a three sub-dimension model of CT drawing on prior studies. Then, by distinguishing the *core causation* and *power sources* underlying each sub-dimension, we attempt to provide a theoretical ground for this model. As to the traits

ofustee, Mayer et al. (1995) developed a conceptual model consisting of trustee's ability, benevolence, and integrity. McKnight et al. (2002) reported a series of confirmatory factor analysis (CFA) evidence consistent with Mayer et al.'s conceptual model. Hence, we propose the following three sub-dimension model corresponding with above studies.

- *Expectations based on Competence*: The positive expectations that are formed from the cognition such that "the supervisor's capability is sufficient to fulfill the role of manager for goal achievement." As summarized in Table 1, this sub-dimension reflects the supervisor's social power with respect to the employee's potential level to grow.
- *Expectations based on Benevolence*: The positive expectations that are formed from the cognition such that "the supervisor is benevolent to me." This sub-dimension mirrors the supervisor's social power with respect to the probability of the employee obtaining the chance to grow and suffering the losses due to weak position.
- *Expectations based on Integrity*: The positive expectations that are formed from the cognition such that "the supervisor has high moral standards, values, and consistency." This sub-dimension reflects the supervisor's social power with respect to the probability of the employee suffering the losses due to troubles.

H2: CT can be divided into three sub-dimensions: (1) *expectations based on competence*, (2) *benevolence*, and (3) *integrity*.

We first identify originally three sub-dimensions of ET from the arguments of trust literatures. Then we carefully distinguish the *core causation* and *power sources* underlying each sub-dimension. Drawing on previous studies' arguments about ET, we identified three important facets of relationship—the emotional tie, shared long-term interests & values, and mutual obligations--which are consistent with three social psychological mechanisms studied in the fields of social power and SER. Thus we propose the following three sub-dimension model:

- *Emotional Linkage*: The positive expectations that are formed from the emotional tie with the supervisor. This sub-dimension mirrors the supervisor's social power with respect to how pleasant the employee feels the communication with him/her to be. And this sub-dimension is rooted in the mechanism of sympathy.
- *Identification*: The positive expectations that are formed from a sense of belonging to an in-group

where members (including the supervisor) have shared the long-term interests and values. This sub-dimension reflects the supervisor's social power with respect to how meaningful the employee feels the sense of belonging to be. And this sub-dimension is rooted in the mechanism of perspective taking.

- *Depending Willingness*: The willingness to deepen the mutual obligations with the supervisor in order to develop further the relationship with him/her, based on the positive expectations for his/her cooperation. This sub-dimension mirrors the supervisor's social power with respect to how warm the employee feels the relationship rich in mutual obligations to be. And this sub-dimension is rooted in the mechanism of (norm of) reciprocity.

H3: ET can be divided into three sub-dimensions: (1) *emotional linkage*, (2) *identification*, and (3) *depending willingness*.

## 3 METHOD

### 3.1 Item Development

In ITWAB project, we developed Cognitive & Emotional Trust Scale-Short Form (CTS-S & ETS-S) to operationalize the hierarchical framework (Liu, 2013). Liu & Li (2015a) examined the psychometric properties of the two higher-order scales in CTS-S & ETS-S such that each has a single factor structure of 14 items, based on Item Response Theory (IRT). This paper further tested the psychometric properties of the six sub-scales in CTS-S & ETS-S, based on Classic Test Theory. The reason is because the well-established method in IRT can only deal with the scale with single factor structure, such as each higher-order scales in CTS-S & ETS-S. The 28 items of CTS-S & ETS-S were expressed in Chinese and Japanese. A linguist checked the semantic and syntactic equivalence of both versions.

In CTS-S (14 items), CT's three sub-dimensions were operationalized as "the positive expectations based on the supervisor' *competence*, *benevolence*, and *integrity*" respectively. For measuring *expectations based on competence*, we selected 5 items from the 19 items of Cognitive Trust Scale (CTS)--a 43-item scale developed in ITWAB project (Liu, 2013). For *expectations based on benevolence*, we selected 4 items from the 9 items of CTS. And, for *expectations based on integrity*, we selected 5 items from the 15 items of CTS.

Table 2: Sub-scale reliability and item descriptive statistics and factor loadings.

14 items of CTS-S	M(SD)		Factor loadings	
	CHN n=301	JPN n=952	CHN n=301	JPN n=952
<b>Expectations based on competence (CHN, <math>\alpha=.96</math>; JPN, <math>\alpha=.94</math>)</b>				
1. My supervisor is known to be successful in both professional and social life	4.03(1.38)	4.62(1.56)	.76	.84
2. My supervisor is well qualified for the post	4.28(1.57)	4.99(1.49)	.88	.90
3. My supervisor is competent and effective in providing professional advice	4.10(1.53)	4.89(1.48)	.90	.90
4. Given my supervisor's track record, I see no reason to doubt his/her competence and preparation for the job	4.18(1.52)	4.94(1.47)	.90	.91
5. My supervisor will form well thought-out plans about his/her job	4.10(1.52)	4.77(1.51)	.87	.91
<b>Expectations based on benevolence (CHN, <math>\alpha=.90</math>; JPN, <math>\alpha=.94</math>)</b>				
6. I believe that my supervisor would act in my best interest	4.26(1.45)	4.44(1.62)	.89	.91
7. I can expect my supervisor to consider my needs and aims from my standpoint	4.04(1.50)	4.40(1.58)	.92	.90
8. If I required help, my supervisor would do his/her best to help me	4.35(1.54)	4.73(1.53)	.91	.90
9. My supervisor is very concerned about my career, not just his/her own	4.07(1.50)	4.34(1.66)	.88	.86
<b>Expectations based on integrity (CHN, <math>\alpha=.95</math>; JPN, <math>\alpha=.94</math>)</b>				
10. My supervisor has a strong sense of justice and morality	4.29(1.42)	4.74(1.56)	.90	.93
11. My supervisor is very consistent in decisions and behaviors	4.13(1.50)	4.55(1.62)	.89	.88
12. My supervisor is sincere and genuine	4.16(1.51)	4.62(1.58)	.80	.90
13. My supervisor care about the future of our organization	4.26(1.45)	4.85(1.54)	.84	.90
14. My supervisor tries hard to behave on the basis of sound principles	4.28(1.46)	4.90(1.55)	.89	.87
<b>Emotional linkage (CHN, <math>\alpha=.97</math>; JPN, <math>\alpha=.94</math>)</b>				
1. My supervisor and I always talk with each other heart to heart	3.86(1.51)	4.45(1.59)	.86	.84
2. I would usually talk with my supervisor about personal troubles	3.64(1.52)	3.62(1.60)	.77	.66
3. I enjoy working with my supervisor very much	3.70(1.48)	4.31(1.46)	.93	.96
4. My supervisor and I recognize and find a kindred spirit in each other	3.89(1.49)	4.24(1.45)	.94	.86
5. My supervisor and I always talk about our work experience and opinions with each other	3.86(1.46)	4.33(1.54)	.88	.85
<b>Identification (CHN, <math>\alpha=.97</math>; JPN, <math>\alpha=.95</math>)</b>				
6. My values are similar with my supervisor	3.52(1.52)	4.20(1.40)	.86	.81
7. My supervisor is the kind of person one would like to have as a friend	3.67(1.57)	4.32(1.61)	.89	.87
8. I feel a sense of gratitude towards my supervisor	4.04(1.59)	4.50(1.61)	.88	.85
9. I feel close to my supervisor because we have a similar way of thinking	3.61(1.54)	4.25(1.54)	.90	.88
10. I have a strong sense of comradeship with my supervisor	3.91(1.55)	4.28(1.59)	.91	.90
<b>Depending willingness (CHN, <math>\alpha=.94</math>; JPN, <math>\alpha=.90</math>)</b>				
11. I would be willing to provide the know-how about how to settle critical work-related problem to my supervisor	4.35(1.45)	4.90(1.39)	.81	.78
12. I would be willing to ask my supervisor to solve some difficult problems for me, even if s(he) has no obligation for these matters	3.54(1.50)	4.07(1.61)	.78	.75
13. Faced with a difficult work situation, I would be willing to work together with my supervisor shoulder to shoulder	4.10(1.47)	5.12(1.37)	.89	.76
14. I would feel secure in using the work-related information from supervisor	4.22(1.48)	4.94(1.42)	.88	.87

In ETS-S (14 items), *emotional linkage* and *identification* were operationalized as “the positive expectations based on the *emotional tie* and the *shared long-term interests & values* with the supervisor” respectively. And, *depending willingness* was operationalized as “the willingness to deepen the mutual obligations with the supervisor (i.e., to positively take the risk due to being in the supervisor’s debt), based on the positive expectations for his/her cooperation.” For measuring *emotional linkage*, we selected 5 items from the 14 items of Emotional Trust Scale (ETS)--a 45-item scale developed by (Liu, 2013). For *identification*, we selected 5 items from the 16 items of ETS. And,

for *depending willingness*, we selected 4 items from the 15 items of ETS.

### 3.2 Sub-Scale Content Validity

Three researchers in ITWAB project team checked the content validity of the six sub-scales. All members have reached a consensus that each of the 28 items is a good representative sample of the corresponding sub-scale’s definition. This implies that for each of the six sub-scales, its operational definition corresponded well to its theoretical definition. Therefore, the content validity of the six sub-scales was confirmed.



### 3.3 Cross-National Samples

The data was collected from China and Japan in 2013, via the specified websites. The language expression between the questionnaire's Chinese and Japanese version was checked by a linguist.

Chinese employees' samples ( $n = 301$ ) were gathered from seven cities of China: Shenzhen, Guiyang, Huainan, Tianjin, Shenyang, Anshan, and Jilin. 48.2% of respondents were male and 51.8% were female. Their average age was 31.39 years ( $SD = 7.48$ ), average job tenure was 6.25 years ( $SD = 7.31$ ), and the average length of time having worked with the current supervisor was 4.43 years ( $SD = 5.02$ ). In terms of education, 6.3% had high school or vocational degrees, 23.9% had junior college degrees, 39.9% had college degrees, and 29.9% had graduate degrees. In terms of post, 49.8% were general employees, 18.9% were low level managers, 17.3% were middle level managers, 6.3% were top level managers, and others (7.6%).

Japanese employees' samples ( $n = 952$ ) were collected from all over Japan through a research company. 55.3% of respondents were male and 44.7% were female. Their average age was 38.74 years ( $SD = 6.50$ ), average job tenure was 12.91 years ( $SD = 7.63$ ), and the average length of time having worked with the current supervisor was 4.13 years ( $SD = 4.45$ ). In terms of education, 26.1% had high school degrees, 23.8% had junior college or vocational degrees, 41.5% had college degrees, and 8.6% had graduate degrees. In terms of post, 43.2% were general employees, 28.0% and 23.6% were low and middle level managers, respectively, and others (5.1%).

### 3.4 Measures

All variables were measured on a 7-point scale from 1 = strongly disagree to 7 = strongly agree. *Distributive justice* was measured using 3 items (Chinese  $\alpha = .93$ , Japanese  $\alpha = .92$ ). An example item was "My salary and treatment reflect the effort I have put into the work." *Disappointment* was measured with 2 items (Chinese  $\alpha = .75$ , Japanese  $\alpha = .63$ ). An example item was "Altogether, my expectations for my supervisor have been disappointed." *Altruistic behavior for supervisor* was measured using 2 items (Chinese  $\alpha = .93$ , Japanese  $\alpha = .93$ ). An example item was "I sometimes sacrifice my own interests to help the supervisor."

## 4 RESULTS

To assess the reliability of the six sub-scales, we computed Cronbach's  $\alpha$  of them. As presented in Table 2, for both Chinese and Japanese version, all six sub-scales met the criterion of  $\alpha \geq .07$ . In addition, the means and standard deviations of the six sub-scales were reported in Table 3. For all six sub-scales, the means of Chinese versions were consistently higher than those of Japanese versions (t-test,  $p < .001$ ).

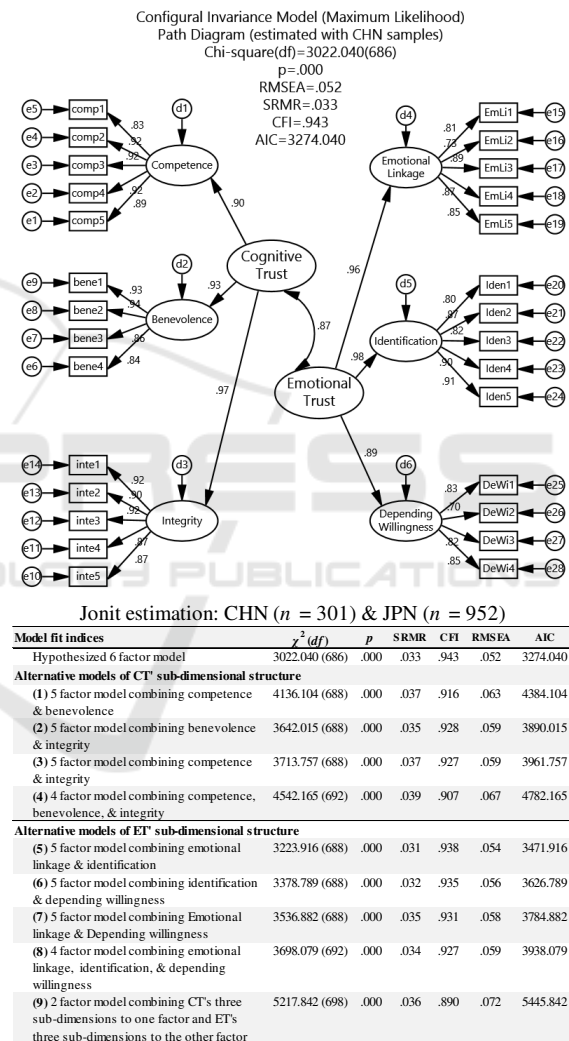


Figure 1: The second-order factor model.

To test the convergent and discriminant validity of the six sub-scales, we compared "the intra-group correlations among the same higher-order construct's sub-scales" and "the inter-group correlations among the different higher-order constructs' sub-scales." As shown in Table 3, for

Table 3: Sub-scale descriptive statistics and correlation pattern.

	Mean (SD) CHN	Mean (SD) JPN	Mean difference	Compet- ence	Benevol- ence	Integrity	Emotional linkage	Identifica- tion	Depending willingness	Distributive justice	Disappoint- ment	Altruistic behavior
Competence	4.84(1.38)	4.14(1.26)	.71***	-	.82***	.84***	.65***	.73***	.72***	.35***	-.47***	.27***
Benevolence	4.48(1.47)	4.15(1.31)	.32***	.79***	-	.86***	.76***	.79***	.75***	.36***	-.47***	.23***
Integrity	4.73(1.44)	4.23(1.27)	.50***	.85***	.86***	-	.72***	.78***	.75***	.36***	-.47***	.28***
Emotional linkage	4.19(1.33)	3.79(1.29)	.40***	.65***	.76***	.72***	-	.88***	.78***	.29***	-.40***	.30***
Identification	4.31(1.38)	3.78(1.37)	.53***	.71***	.79***	.77***	.88***	-	.85***	.32***	-.44***	.32***
Depending willingness	4.76(1.23)	4.06(1.23)	.70***	.70***	.69***	.71***	.77***	.82***	-	.25***	-.39***	.36***
Distributive justice	3.99(1.44)	3.73(1.16)	.26**	.40***	.48***	.43***	.42***	.48***	.45***	-	-.30***	.06
Disappointment	3.72(1.38)	4.06(.95)	-.34***	-.37***	-.45***	-.43***	-.36***	-.41***	-.37***	-.39***	-	-.02
Altruistic behavior	4.43(1.30)	3.98(1.05)	.45***	.14*	.20***	.11	.27***	.27***	.27***	.07	.09	-

The lower triangular part = Chinese data ( $n = 301$ ). The upper triangular part = Japanese data ( $n = 475$ ). \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

both Chinese and Japanese version, the intra-group correlation coefficients among CT's (or ET's) three sub-scales were stronger than the inter-group correlation coefficients between CT's sub-scales and ET's sub-scales on average. Thus, the convergent validities of the sub-scales within each of the higher-order constructs (CT & ET), and the discriminant validities of CT's sub-scales from ET's sub-scales were confirmed.

To further test the construct validity of the six sub-scales, as shown in Table 3, we computed the correlations between them and some external variables. For both Chinese and Japanese version, the six sub-scales were positively related to *distributive justice* and negatively related to *disappointment* (antecedents); and positively related to *altruistic behavior for supervisor* (effect) consistently. This correlation pattern was consistent with Dirks & Ferrin's (2002) meta-analysis results. Hence the construct validity of the six sub-scales was (re)confirmed.

To test the three hypotheses, we built a second-order factor model to represent them. As shown in Figure 1, by joint estimation with Chinese and Japanese samples, the hypothesized model met the criterion of  $CFI \geq .95$  &  $SRMR \leq .08$ , and was superior to all alternative factor models in Akaike's Information Criterion (AIC). Thus the second-order factor model was configural invariant across Chinese and Japanese samples. Therefore, all three hypotheses were supported by the two countries' samples.

## 5 CONCLUSIONS

The first purpose of this paper is to develop the sub-dimension models of CT & ET so as to test an original hierarchical framework (Figure 1). The three hypotheses describing the configuration of this framework were supported by Chinese and Japanese

samples. This fact suggests that each of the two trusts has a general sub-dimensional structure, and our sub-dimension model capture it well.

The second purpose is to assess the psychometric properties of the six sub-scales in CTS-S & ETS-S, which operationalize the six sub-dimensions. The results of psychometric analyses validated the six sub-scales for both Chinese and Japanese version.

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