

Relation between safety and happiness for worker at work - Introduction of case studies from quantitatively measure and visualize well-being to connect to “KAIZEN”

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ABSTRACT

Up until now, we have always aimed to reduce risks and eliminate accidents as the goals of occupational safety. By conducting risk assessments of machinery and work and implementing “intrinsically safe design” and “safety protection and additional protection measures”, we have created an environment for safe work and strived to reduce risks as close to zero as possible. There is no doubt that these efforts to date continue to be important, but workers, assigned risk reductions, tended to be focused on and pointed out where were not sufficient. Although it was necessary, workers tended to be attitude passive rather than proactive against safety promotion and risk reduction activities. The times are changing, as recent global trends reflected in SDGs and other initiatives are also pursuing “work satisfaction”, or well-being (WB), for workers. The WB is defined in the preamble of the WHO Charter: “Health is a state of complete physical, mental and social WB and not merely the absence of disease or infirmity”. Translating this definition to workplace, it becomes a state in which “employees are satisfied physically, mentally, and socially in the workplace”. In recent years, emphasis has been placed on the idea that creating such an environment should make the workplace more comfortable, strengthen organizational strength, and increase performance and motivation. In fact, Goal 8 of the SDGs sets out “Decent Work and Economic Growth”, which aims to protect the environment, promote sustainable economic growth, and ensure that all people have meaningful and well-paid work. By having workers more proactively involved in safety, it will also lead to activities where they can create safety themselves. In other words, the movement for workplace WB stems from the current need for workplaces to not only be safe and secure, but also to satisfy the motivation to work, such as having a sense of purpose in life, fulfillment and job satisfaction. C. Ryff (1989), an American WB researcher, says, "At a more general level, the field of psychology has, since its inception, been more concerned with human misfortune and suffering than with the causes and effects of positive functioning". Now there is a growing interest in the study of psychological WB, recognizing that it has received far more attention. Psychological WB is nothing but WB, which is defined as "sustainable happiness". Similarly, a new concept of "positive safety" has been born in Japan. This can be said to be a new direction for occupational safety, which aims not only to avoid risks but also to transform the workplace into a safe, comfortable, and rewarding place. Based on this philosophy, we started to measure safe/unsafe behavior of worker quantitatively and objectively and to analyze safety and WB of workers, and if necessary, make improvements to the workplace to improve the workplace environment. In other words, we are now attempting "optimization" at work. We hypothesize that there are two types of workplace WB. In other words, the happiness that comes from being given a "safe and secure workplace", and the happiness that comes from finding "purpose in life", "challenge" and "job satisfaction". When you have a "safe and secure workplace", you feel a general feeling of WB that we associate when we hear the word "happiness". It refers to the "achievement of pleasure" in which the greater the intensity and frequency of emotions, the greater the sense of happiness. This is called "subjective WB". It can be said that previous efforts to reduce the risk of occupational accidents (defined as a function of the "severity and frequency of harm") have contributed to this improvement in subjective WB. Furthermore, the "sense of accomplishment" that you feel when you make the most of your abilities and realize your personal goals and objectives is another type of WB called "psychological WB". We believe that establishing a work environment in which workers can feel more comfortable and self-actualized while working constitutes psychological WB. In the future, as advocated by the SDGs, it is the responsibility of corporate management to take measures and strategies to enhance these two types of WB. In addition, a means of evaluating them is required. In this talk, I quantify and "visualize" these two types of WB in the workplace, and propose an "optimization" method to improve the visualized WB. In our project, we will construct a measure of WB specific to workers in the field, based on the measures of subjective WB and psychological WB established by Diener (1984) and Ryff (1989), respectively. That is the final purpose. In this project, we will introduce data from 92 people who responded to an online questionnaire from September 4, 2023 to December 26, 2023. A radar chart was created based on a total of 7 items: The subjective WB scale developed by Diener and the six subscales of psychological WB proposed

by Ryff. Six subscales are: 1) Personal growth, 2) Purpose in life, 3) Autonomy, 4) Environmental mastery (controlling the environment), 5) self-acceptance, and 6) positive relationships with others. Radar charts of various shapes were observed for various industries, and it became clear that there are industry-specific differences in WB. In the future, we plan to use behavioral analysis interventions to optimize the workplace.

1. Introduction

Until now, in the field of occupational safety, we have aimed to reduce risks and achieve zero accidents. By conducting risk assessments of machines and work and implementing "intrinsically safe designs" and "safety protection and additional protective measures," we have striven to create a safe working environment and bring risks as close to zero as possible. There is no doubt that our efforts to date are important.

However, times have changed, and the recent global trend reflected in the SDGs and other goals is also pursuing workers' "job satisfaction," or happiness. Happiness is defined in the preamble to the WHO Constitution as "health is a state of complete physical, mental and social well-being (WB) and not merely the absence of disease or infirmity." If we apply this definition to the workplace, it becomes a state in which "employees are physically, mentally and socially satisfied at work." In recent years, the idea that creating such an environment makes the workplace more comfortable, strengthens organizational strength, and increases performance and motivation has been emphasized. In fact, Goal 8 of the SDGs sets out "decent work and economic growth," which aims to protect the environment, promote sustainable economic growth, and ensure that everyone has access to rewarding and adequately remunerated work. We are also actively engaged in this activity. The movement for workplace WB requires not only that the workplace is safe and secure, but also that it satisfies motivation to work, such as a sense of purpose in life, a sense of fulfillment, and job satisfaction.

In this paper, we explain WB and introduce a method to quantitatively evaluate WB.

2. What is Well-being?

In our definition, well-being is a condition of "being well", that means continuously last the happy condition. Paradoxically speaking, the word "happiness" and/or "happy" is more temporal feeling, then well-being is distinguished from these words by this point of view. In Psychological research, there were a stream that WB is roughly divided into subjective well-being (SWB) and psychological well-being (PWB). SWB indicates hedonic aspects such as the realization of pleasure and avoidance of pain, and refers to subjectively pleasant sensations such as the abundance of positive emotional experiences and satisfaction with life³). Replacing this with the WB that workers feel at the work site, it can be said that the work environment feels "safe and secure".

The other PWB indicates positive psychological functions throughout life, such as the desire for meaningful life and self-actualization⁴). PWB further emphasizes (1) autonomy, (2) environmental mastery, (3) personal growth, (4) purpose in life, and (5) positive relationships with others. (with others), and (6) self-acceptance. Similar to SWB, PWB is expected to strongly reflect job satisfaction, self-growth, self-acceptance, and the satisfaction of relationships with others and the environment. The concept of PWB in the field of occupational safety can be interpreted as happiness in the sense of 'motivation' and 'work satisfaction' that workers feel while working at work.

So far, most work-specific WB research has been focused on subjective WB (mental health area), which is concerned about depression or mental disorder after the labor accident, mental injury. In fact, according to ISO45003, WB in occupational hygiene field seems to be in category from mental and/or physical disorder up to rework condition. On the other hand, in occupational safety field, WB is started at somehow healthy and workable condition, and toward happily and rewarding job condition. In that sense, until now there have been no indicators that capture WB from the perspective of occupational safety in the workplace. Therefore, it is not adequately examined about WB, which changes due to short-term factors such as working hours, has not been investigated so far.

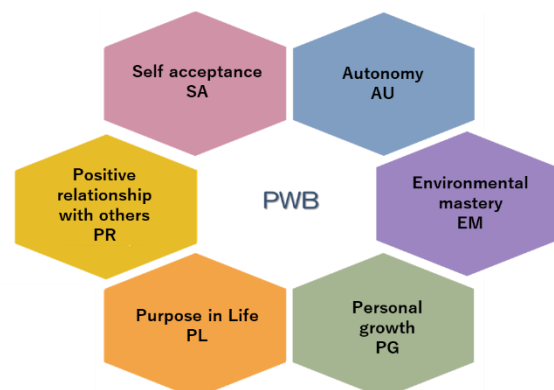
A. Subjective well-being; SWB

by Diener (1984)

- Life satisfaction (cognitive evaluation of life)
- Positive and negative emotions

B. Psychological well-being; PWB)

by Ryff (1989)



3. Well-being investigation specifically for workers at work during working hours (visualization of WB at workplace)

Dr. Mukaidono recently has been mentioned about WB at work in Positive safenology by his own theory. In his theory, safety should be directed to POSITIVE, addition to the current safety activity which is direction from risk reduced (NEGATIVE to nearly ZERO direction). In other word, Occupational safety should make workers in a stable happy and health state. Until now, safety studies have focused on industrial accidents and human error, and have sought to solve these problems, but simply making a dangerous situation safe does not mean that people can work happily. This means that while such activities are important, it is also necessary to create a workplace where people feel a sense of purpose and fulfillment from now on.

Table 1. The scaled of SWB

	同意しない			どちらでもない	同意する		
	全く	ほとんど	あまり		やや	かなり	非常に
a. ほとんどの面で、私の人生は理想に近いものだ	1	2	3	4	5	6	7
b. 私の人生は、とてもすばらしい状態にある	1	2	3	4	5	6	7
c. 私は、自分の人生に満足している	1	2	3	4	5	6	7
d. 私は、これまで自分の人生で望んだ重要なものを手に入れてきた	1	2	3	4	5	6	7
e. もう一度人生をやりなおせるとしても、私には変えたいと思うところはほとんどない	1	2	3	4	5	6	7

Table 2. The scale of PWB

	同意しない			どちらでもない	同意する		
	全く	ほとんど	あまり		やや	かなり	非常に
a. 一般的に、私は目の前の状況を把握していると感じる	1	2	3	4	5	6	7
b. 私は、今、一日一日を生きているのであって、将来のことを深く考えたりしない	1	2	3	4	5	6	7
c. 私は、自分の人生を振り返ってみて、結果として起きていることをうれしく思う	1	2	3	4	5	6	7
d. 毎日の生活でやらなければならないことに、しばしば愕然と感ずる	1	2	3	4	5	6	7
e. 自分や世の中についての考え方を変えさせるような新しい経験をすることは、大切だと思う	1	2	3	4	5	6	7
f. 親密な関係を維持することは、私にとって難しく、また欲求不満のもとになっている	1	2	3	4	5	6	7
g. 私は、強い意見を持つ人に影響されがちだ	1	2	3	4	5	6	7
h. たとえ一般に合意されていることに反しても、私は自分の考えに自信をもっている	1	2	3	4	5	6	7
i. 毎日の生活でいくつもある責任をやりくりすることに、私は長けている	1	2	3	4	5	6	7
j. 私は、自分の性格をおかたにおいて好きだ	1	2	3	4	5	6	7
k. 私にとって、人生とは、学び続け、変化し続け、成長し続けるものである	1	2	3	4	5	6	7
l. 人は私のことを、「他の人のために時間を費やす面倒見のいい人だ」というだろう	1	2	3	4	5	6	7
m. 私は、自分が人生で成してきたことの多くに失望している	1	2	3	4	5	6	7
n. 人生をとてもよいものにしようとか、変えようとかすることは、とうの昔にあきらめた	1	2	3	4	5	6	7
o. 心温まり信頼できる人間関係をもったことは、それほどない	1	2	3	4	5	6	7
p. 私は、他の人が大切だと考える価値観ではなく、自分が大切だと考えることで自分を判断する	1	2	3	4	5	6	7
q. 目的を持たずに人生を放浪する人もいるが、私はそのような人間ではない	1	2	3	4	5	6	7
r. 私は、ときどき、人生でなすべきことはすべてなしてきたかのように感じる	1	2	3	4	5	6	7

Therefore, we launched a project to recruit participants via the web and measure SWB and PWB as a clue to assessing workers' WB during working hours in the workplace. We conducted a survey based on the hypothesis that there may be differences depending on the type of job. The scales in Japanese we tested are shown in Tables 1 and 2.

Well-being Survey Status: 92 people responded to the survey between 2023/9/4 and 12/26. Figure 1 shows the survey results in a radar chart with the average value of respondents by industry. Among the axes of the radar chart, "Subjective" is Diener's subjective well-being, and the other six axes are Ryff's psychological well-being. **Subjective well-being, SWB** is defined as a subjective evaluation of one's own life, and psychological well-being is defined as follows: **Personal growth, PG:** A sense of being on a continuum of development and possibility, and open to new experiences. **Purpose in life (life purpose), PL:** A sense of purpose and direction in life. **Autonomy, AU:** A sense of being self-determined, independent, and able to internally regulate one's actions. **Environmental mastery, EM:** A sense of competence in controlling the complex surrounding environment. **Self-acceptance, SA:** A positive sense of self. **Positive relationships with others, PR:** A sense of building warm and trustworthy relationships with others. The definitions of the axes are taken from "Nishida Yukiko, Study on diverse lifestyles and psychological well-being of adult women, Educational Psychology Research, 2000, 48, 433". We are conducting research to investigate the relationship between these two indicators, plus medical well-being, and safety. Figure 2. showed the results of the website survey of SWB and PWB of workers. Although the number of participants is still insufficient, the results show that there are differences in WB depending on the occupation. We are still doing this survey and try to capture the unique WB aspects of each occupation for optimization of each worksite.

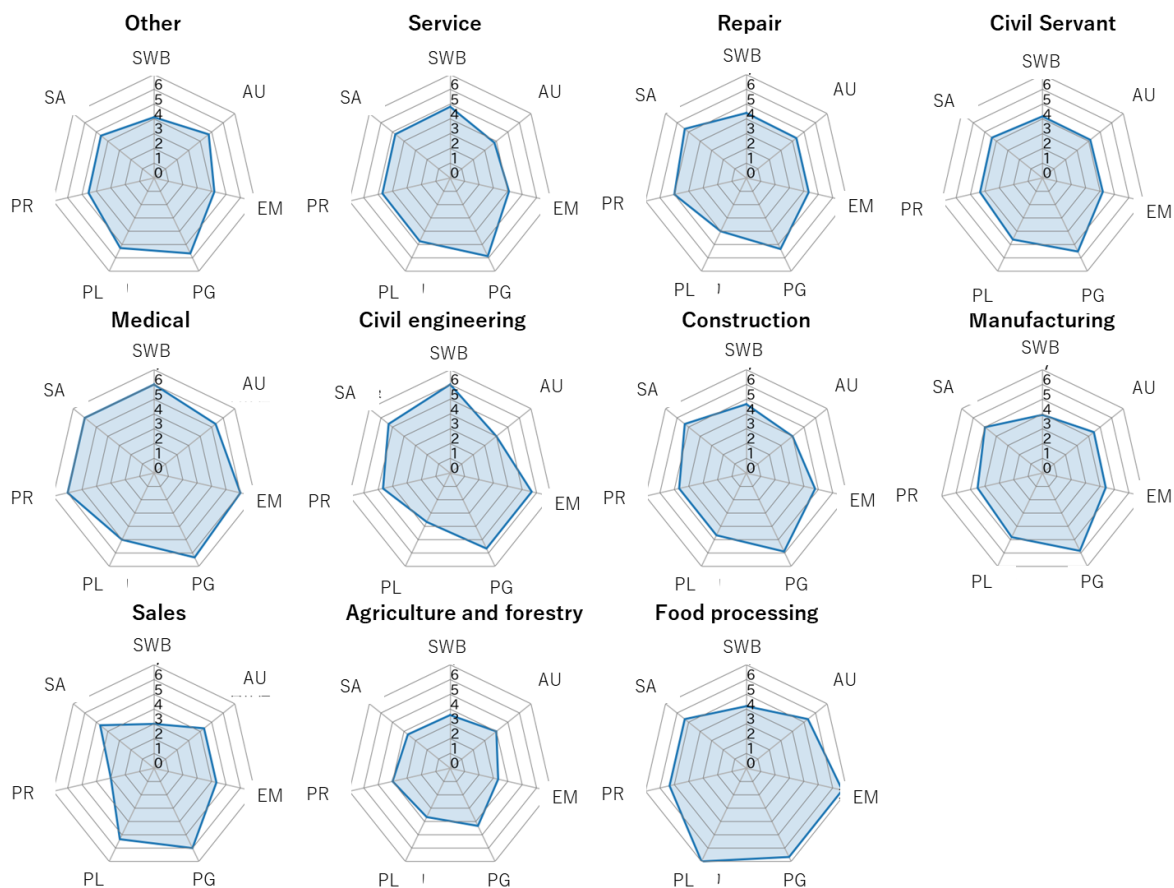


Figure 2. Results of the website survey **Anada, Hojo Survey results, 2023/12/26,**
<https://www.atelier-inc.com/bbs/>

This project has just started and the number of data is not enough. It can be said that it is very important to clarify the WB specialized for the workplace of the worker in the current situation where the work style at the workplace is rapidly changing. We believe that new technologies such as IoT, ICT, and AI are being introduced into the workplace at a rapid speed, and that it will be an important clue to know whether workers are responding to these changes. It may also be useful for evaluation under conditions where high expectations are placed on the labor

force of foreigners and elderly people. In the future, I would like to continue the survey at various sites and collect data.

Table.3 Original scales of Subjective Well-being (SWB) by Diener (upper 5 questions) and Psychological Well-being (PWB) by Ryff with 18 questions in lower part.

SWB
In most ways my life is close to my ideal.
The conditions of my life are excellent.
I am satisfied with my life.
So far I have gotten the important things I want in life.
If I could live my life over, I would change almost nothing.

PWB
In general, I feel I am in charge of the situation in which I live.
I live life one day at a time and don't really think about the future.
When I look at the story of my life, I am pleased with how things have turned out so
The demands of everyday life often get me down.
I think it is important to have new experiences that challenge how I think about myself and the world.
Maintaining close relationships has been difficult and frustrating for me.
I tend to be influenced by people with strong opinions
I have confidence in my own opinions, even if they are different from the way most
I am good at managing the responsibilities of daily life.
I like most parts of my personality.
For me, life has been a continuous process of learning, changing, and growth.
People would describe me as a giving person, willing to share my time with others.
In many ways I feel disappointed about my achievements in life.
I gave up trying to make big improvements or changes in my life a long time ago
I have not experienced many warm and trusting relationships with others.
I judge myself by what I think is important, not by the values of what others think is
Some people wander aimlessly through life, but I am not one of them.
I sometimes feel as if I've done all there is to do in life.

