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**Classification:** FOR Code: 160499

**Language:** English



London  
Journals Press

LJP Copyright ID: 92563  
Print ISSN: 2631-8490  
Online ISSN: 2631-8504

London Journal of Research in Science: Natural and Formal

Volume 19 | Issue 6 | Compilation 1.0





# A New Model of Human Needs

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**Author:** Førstveien 5A, 1367 Snarøya, Norway.  
E-mail: ikopsov@gmail.com

## I. INTRODUCTION

Maslow has had an immense impact on the development of psychology and social sciences. As one of the founding fathers of humanistic psychology, he has also exercised a profound influence on other disciplines, such as management, nursing, and education. Contrary to common belief, scientists have seriously

questioned the postulations of Maslow's theory of human motivation [1]. Criticism has been aimed at several propositions; (a) a 'very serious lack of sound data in this area'(e.g., Wahba & Bridwell [2]); (b) the ethnocentric nature of underlying hypotheses stating that 'no claim' can be 'made that that is ultimate or universal for all cultures' (e.g., Cianci & Gambrel [3]); (c) questionable allocation of particular needs into some categories (e.g., Kenrick [4]), for example, sexual intercourse is grouped with other physiological needs, however critics point out that 'one may make love not only for pure sexual release, but also to convince one's self of one's masculinity, or to make a conquest, to feel powerful, or to win more basic affection'; and (d) the hierarchy of needs is not universal and affected by circumstance (e.g., Tang *et al.* [5]) as 'the average member of our society is most often partially satisfied and partially unsatisfied in all of his wants', moreover 'reversals of the average order of the hierarchy are sometimes observed. Also, it has been observed that an individual may permanently lose the higher wants in the hierarchy'. The above statements show that Maslow's theory is far from being universally accepted for a variety of valid reasons. Noteworthy, the criticisms quotes discussed in this paragraph are all taken from 'The Theory of Human Motivation' written by Abraham Maslow himself [1]. Maslow's reflections show that he was not conceptualizing a system of rigid postulates, but in his own words, was developing a 'program or framework for future research'.

Maslow's reflections are supported by Tay & Diener [6], who researched the correlation between satisfaction of needs of different potency and subjective well-being (SWB) and "found evidence of universality and also substantial

independence in the effects of the needs on SWB". They concluded that "observed needs tend to be achieved in a certain order but that the order in which they are achieved does not strongly influence their effects on SWB. Motivational prepotency does not mean that fulfilling needs '

out of order' is necessarily less fulfilling. Thus, humans can derive 'happiness' from simultaneously working on a number of needs regardless of the fulfilment of other needs".

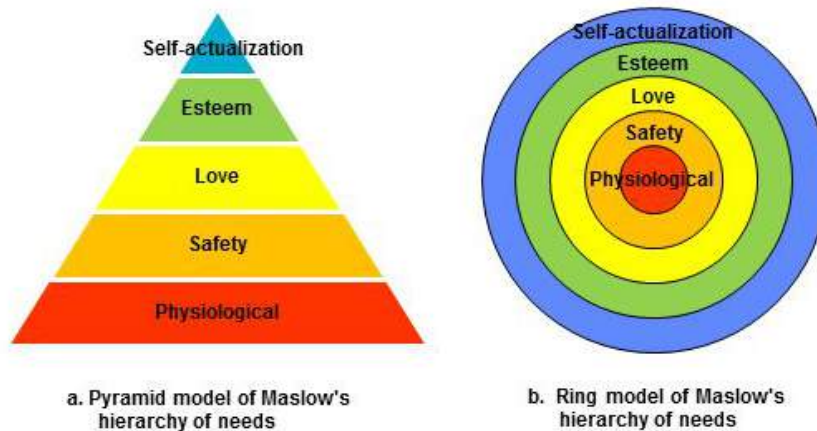


Fig. 1: Pyramid and ring models of human needs

Maslow never proposed a model or a diagram to illustrate his theory, and, in fact, not once referred to a pyramid of needs in his works. Indeed, in many instances, the pyramid (Figure 1 (a)) is a false representation of human needs. It fails to illustrate the degree of dominance (frequency of occurrence) of the particular needs of an individual. The pyramid model is unsuitable for representing the variation of needs between individuals. Its structure is intrinsically rigid and cannot be adjusted to account for personal and ethnic particularities. Only to a limited extent can it be used to illustrate the etiology of needs, whether in the context of personal or anthropological development, as the emergence of new needs cannot be simply added to the pyramid structure without its rearrangement. Finally, the pyramid cannot explain the occurrence of conflicts of needs in cases when responses to high-level needs are achieved at the expense of other, more potent needs, since according to the pyramidal hierarchy of human motivation, the latter always prevail.

Numerous attempts to enhance the theory of human motivation have been made. According to Ilyn [7], there are by now more than 50 theories of motivation and their number continues to rise [8, 9]. Despite the efforts to propose a fully proven alternative, Maslow's comment on the 'absence of a valid theory of motivation' verified by evidence of research remains relevant nowadays, as it was at the time when his work was initially published. Furthermore, personality psychology tends to be analysed these days through the lens of psychometrics and neuroscience. The result is that the contribution of psychology to what might be referred to as the "philosophy of life" is often left out of scientific discourse. We believe that the stagnation of progress in advancing a motivational theory is partly related to the lack of a valid model of human needs.

In this paper we attempt to develop a generic model of human needs which would allow quantitative representation of needs and take into account their variable nature. In doing so we approach the theory of needs not as a standalone

phenomenon but as an integral component of the overall concept of human behaviour.

## II. ALGORITHM OF HUMAN BEHAVIOUR

Thorough assessment of human needs requires an understanding of general mechanisms of initiating, controlling, and gratifying human

actions. Further, we provide an algorithm of human behaviour defining the role of needs and their interdependence on other factors of human activities. The algorithm, presented in Figure 2 and summarised in the following paragraphs, has been theorised by us within a framework based on the novel concept of subjective well-being [10].

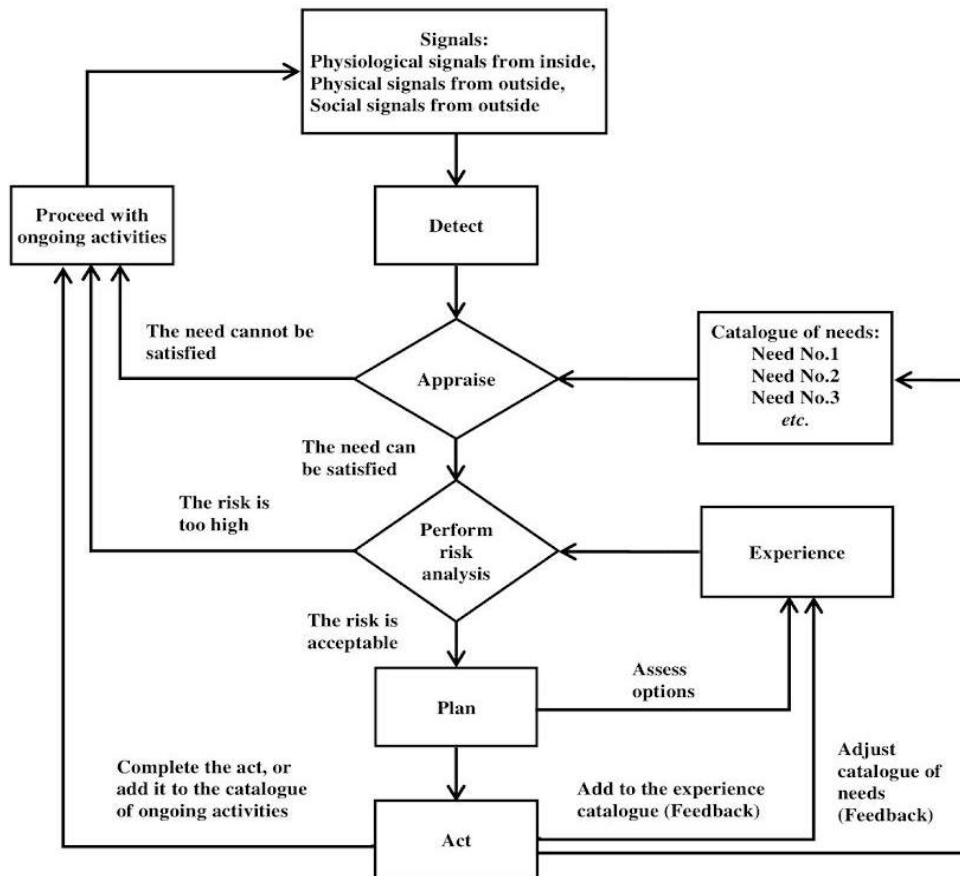


Fig. 2: Algorithm of Human Behaviour

At all moments individuals experience a range of intrinsic and extrinsic body signals. Each signal is immediately subjected to an assessment in order to determine whether it is relevant to the satisfaction of any dominant need. Based on the result of the signal assessment, risk analysis is performed for possible action scenarios. Risk analysis is carried out based on life experience, which also includes attitudes, norms, and perceived behavioural control [11]. Humans rate the likelihood of potential gains and losses of an

action against the criticality of a given need. In most instances, a decision is driven by the outcome of the evaluation of estimated energy expenditure versus estimated utility gain. The analysis also addresses potential consequences of the outcome of the worst-case scenario. If gains are assessed to be substantial, possible failures manageable, and estimated energy expenditure acceptable, the individual proceeds to the next step of the decision making process. Otherwise, a potential action is abandoned.

If based on the risk analysis a go-ahead is given, the next step is to plan the action. If the goal can be achieved in a variety of ways, multiple iterations between risk analysis and planning phases may be required prior to determining the way forward.

The final phase is action execution, which is based on the predetermined plan. As the action progresses, new signals are received and evaluated, and behaviour is subsequently readjusted accordingly with the new information gained. Human life is a continuous chain of actions executed in accordance with the described standard algorithm. Important to emphasise, that we ascribe actions not in a behaviouristic way but within a broader context, with actions being responses to an entire range of physiological, psychological and social needs, including needs of eudaimonic dimensions.

Besides the execution sequence “signal detection – assessment – risk analysis – plan – action” the behavioural algorithm includes regulating blocks controlling the assessment and risk analysis steps; i.e. a catalogue of dominant needs and an experiences database.

The catalogue of dominant needs is defined by intrinsic life circumstances, it is fluid and versatile, and always reflects the outside environment and subjective state of an individual’s psyche. It may be described as the “engine” of the algorithm, which triggers any undertaken activity. When intent towards an activity is instigated by needs, it is subsequently subject to a risk analysis that is performed based on an individual’s life experiences. Each individual has a “repository” of past experiences, completed actions, and their outcomes. This repository is different in all individuals, and we refer to it as the experience database. It stores and remembers practical lessons learned, and consolidates attitudes, norms, and cultural predispositions. The experience database is dynamic, continuously updated and altered throughout life.

Actions are initiated, and subsequently executed, due to and based on dominant needs and the experience database. In turn, outcomes of actions form the experience database and redefine the catalogue of needs, which triggered actions in the first place. As such, the components of the behavioural algorithm are interlinked by feedback mechanisms. Per Figure 2, the algorithm includes several such feedback loops; 1) risk analysis – plan – life experience – risk analysis; 2) risk analysis – action – life experience – risk analysis; 3) catalogue of dominant needs – action – catalogue of dominant needs. Feedback loops continuously generate updates resulting in dynamism of human cognitive and emotional states. Individuals always exist in a state of unbalance that requires continuous effort and adjustment to preserve and continue the existence of an organism. The behavioural algorithm represents a dialectical model of human development and incorporates non-linear interactive dynamism between individuals and their environment.

All stages in the algorithm of human behaviour (Figure 2) may impact human existence. Missed or incorrectly interpreted signals, inadequately assessed risks, poorly constructed plans, or faultily executed actions may all influence SWB levels. Performance efficiency in each algorithm phase is affected by an individual’s physical, psychological, and cognitive capabilities. For a standalone action, taken in isolation from personal disposition and life circumstances, physical and cognitive skills appear to have a decisive role in forging success and happiness. However, subjectively, success is always calibrated against an individual’s needs. Identification of priority needs, which are manifested through wants, goals, aspirations, and dreams, plays a crucial role in defining an individual’s SWB. The highest level of life satisfaction is attained when needs are highly correlated with the abilities required to achieve them. Fine-tuning the balance between needs and skills is one of the functions of the human psyche.

### III. A RING MODEL OF HUMAN NEEDS

An idea of alternative modeling of needs was initially put forward by Scholz [12] who suggested that layers of needs better illustrate Maslow's theory rather than a pyramid. The drawback of this method is that it loses most, if not all, features of a true model and can be replaced with a list of the level of potency and relative weight of needs. Kenrick *et al.* [4] presented a modified pyramidal model by depicting the goals not as stacked on top of one another, but as overlapping each other. This change reflected the idea that early developing motives are unlikely to be fully replaced by latter goals but instead continue to be important throughout life, depending on individual differences and proximate ecological clues.

Here we propose a new model of human needs that allows to resolve the limitations of the conventional approach. We conceptualize that needs are most appropriately represented by a Ring Model, as shown in Figure 1 (b), where each need category is depicted as a ring rather than a layer. This approach introduces flexibility into the setup of needs, which is lacking in the pyramided structure.

The Ring Model is contingent but not constrained to a particular theory of human motivation. If required, it can be tailored to suit underlying theoretical bases. The most important feature of the model is that it allows a quantitative rather than a purely qualitative description of the phenomena of human needs. Direct quantitative representation of Maslow's hierarchy of needs is not feasible, as he proposed categorization of needs based on their potency, without offering any credible ranking criteria. However, Maslow's theory paved the way for the studies of Well-being and Subjective Well-Being [13]. Within these premises of research, it was attempted to perform a quantitative analysis of human needs in correlation with SWB. The most detailed survey was conducted by The Gallup World Poll during the period 2005-2010 [6, 14]. The association

between the fulfillment of needs and SWB was examined across a sample of 123 countries, with 60,865 individuals taking part in the exercise. All responders were grouped into eight cultural regions. SWB was defined as a combination of cognitive (i.e. life evaluation) and affective components (i.e. positive and negative feelings) [15]. For the purpose of the study the following categories of needs were derived from the work of Maslow [16], Deci and Ryan [17], Ryff and Keyes [18], De Charms [19] and Csikszentmihalyi [20]; basic needs for food and shelter, safety and security, social support and love, feeling of respect and pride in activities, mastery, and self-direction and autonomy. The study produced a large set of statistical data [6]. We extracted some of it for a particular case of the Relative Importance of Needs in Life evaluation by the population of two geographical regions, i.e. Africa and Northern Europe/Anglo nations. The data was used to establish typical examples of quantitative rings in the Ring Model (Figure 3), where the relative area of each need category ring corresponds to its Relative Importance in Life Evaluation. The total relative importance always adds up to 1.00, with each need importance value representing its proportional contribution.

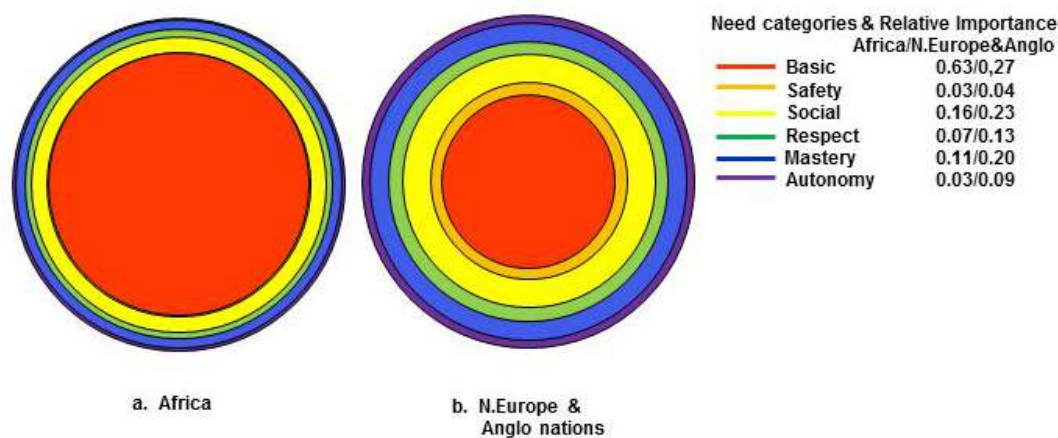


Fig. 3: Relative Importance of needs in Life Evaluation.

The ring diagrams in Figure 3 illustrate variations in the assessment of the importance of needs between populations of different cultural regions and offer a bespoke depiction of phenomena of needs in the social context, thus providing the basis for evaluation of cultural and social differences in human psychology. The examples show how introducing tailored quantitative models of needs allows to counter for the criticism of Maslow’s theory for its ethnocentric nature.

Similarly, the Ring Model can be applied in the analysis of the evolution of needs, be that phylogenies, anthropogenesis, or human ontogenesis. This is noteworthy, considering that Maslow himself pointed to ‘the etiology of the basic needs and their possible derivation in early childhood’ as one of the basic problems requiring further analysis.

Kenrick, Griskevicius, Neuberg, and Schaller [21] suggested that Maslow’s list of needs might be derivable from evolutionary theory (see also Hill & Buss [22]). Such ideas provide an entirely new point of view of the evolutionary process. Traditionally evolution of species is described as emergence of differentiating features through the process of adaptation or enhancement of capabilities. Variations in capabilities become so vast that the general link between various species appears to be lost in the process. A situation may be perceived entirely differently, if one

approaches the description of the evolutionary process in terms of the development of needs rather than in terms of abilities. From this point of view, with some adaptation, the motivational approach is valid not only for human beings but also for other mammals, invertebrates and plantae, etc. For example, a human’s need for water, which is not that different from that of plants. The assessment of needs within the evolutionary process can provide a common denominator that allows analyzing commonalities between different life forms. The ability to present quantifiable data makes the Ring Model suitable for recording and tracking the changes that occur throughout the process of alteration of needs, and it may become a useful tool to further advance theories of motivation, psychological development, and evolution.

The Ring Model of needs shown in Figure 3 is created using the Relative Importance of needs in Life Evaluation as a criterion for the allocation of weight factors to need categories. The input data were obtained from a sociological survey of SWB. This is a plausible approach if one accepts the postulate that the Relative Importance of needs in evaluation of life is a valid indicator of their dominance. However, the model is open to use of other criteria for weighing of needs, e.g., allocation of time or other resources to the attendance of needs.



#### IV. A DYNAMIC RING MODEL OF NEEDS

Maslow described his theory as ‘general-dynamic’ [1]. He explains that:

“The physiological needs, along with their partial goals, when chronically gratified cease to exist as active determinants or organizers of behaviour. They now exist only in a potential fashion in the sense that they may emerge again to dominate the organism if they are thwarted. But a want that is satisfied is no longer a want. The organism is dominated and its behaviour organized only by unsatisfied needs. .... most members of our society who are normal, are partially satisfied in all their basic needs and partially unsatisfied in all their basic needs at the same time. A more realistic description of the hierarchy would be in terms of decreasing percentages of satisfaction as we go up the hierarchy of prepotency, For instance, if I may assign arbitrary figures for the sake of illustration, it is as if the average citizen is satisfied perhaps 85 per cent in his physiological needs, 70 per cent in his safety needs, 50 per cent in his love needs, 40 per cent in his self-esteem needs, and 10 per cent in his self-actualization needs.”

This statement provides further evidence for why a pyramidal representation of Maslow’s motivational theory is misleading. It may correctly depict Maslow’s ideas concerning the potency vector of the emergence of needs but gives a false picture of the human psyche in regard to the balance of needs and their perpetually changing nature.

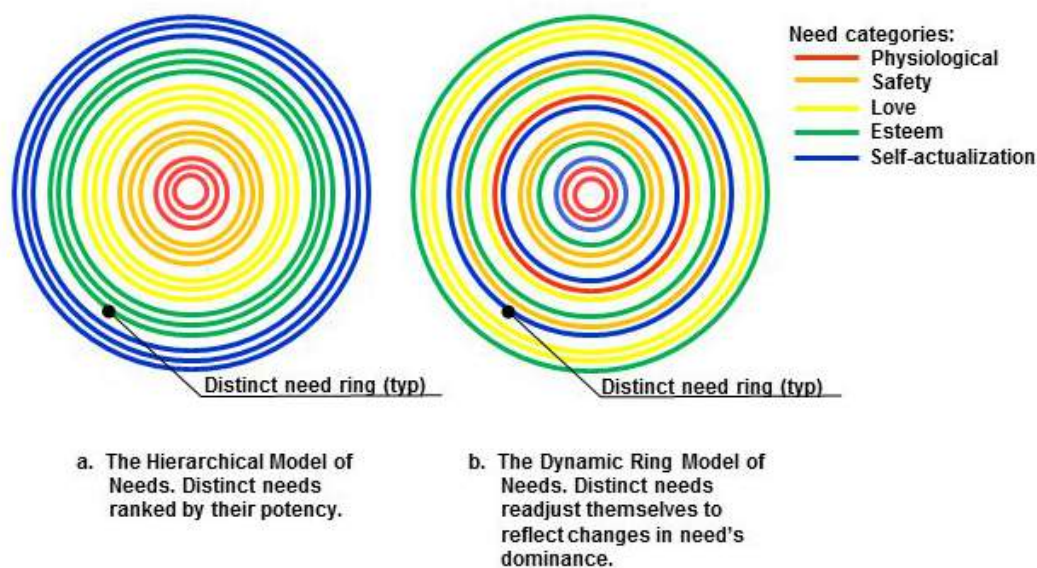
The Ring Model contains a feature for ranking needs by allocating them a weight factor, which opens the possibility for developing a truly dynamic diagram of human needs. In order to achieve this, needs should be assessed at a higher degree of detail. Use of needs, or rather need categories, as defined by Maslow or other scholars may be sufficient in the analysis of social or evolutionary phenomena of needs. However, this approach becomes too generalistic for depicting a momentary state of needs in an individual. To

capture the constantly evolving state of the human psyche, the model must be based on distinct needs or wants as defined by Maslow.

Each need’s category consists of a set of distinct needs, the sum of which forms a perpetually changing field of needs, as their criticality is adjusted, their satisfaction is achieved, or they become obsolete. In the Ring Model each distinct need has a corresponding ring allocated to it. The area of a ring of a distinct need is proportional to its weight, i.e. dominance. Each behavioural act correlates with an adjustment of an orbit of the corresponding need, which alters its relative weight as a result of actions. Maslow pointed out that ‘typically an act has more than one motivation’. Hence, a single action can cause adjustments of the weights of several needs. Throughout the course of life, distinct needs belonging to different categories become mixed, and borders between categories of needs are blurred. The rigid structure of the needs hierarchy (Figure 4 (a)) transforms into a dynamic field of needs (Figure 4 (b)) that are distributed according to their weight (dominance), and not through potency or criticality ranking. For example, the need for oxygen has the highest potency ranking. In normal circumstances, in abundance of oxygen, the weight of this need is so low that it is hardly detected by an individual and it has no impact on his behaviour, and as such, the corresponding oxygen need orbit is hardly noticeable on the diagram of needs. However, if the environment changes, for example, as a result of diving in water, the need for oxygen acquires a very high weight and becomes a prevailing behavioural driver. The ring corresponding to the need for oxygen immediately appears on the diagram of needs and occupies a dominant position. As the need for oxygen is satisfied, *e.g.*, a diver reaches the water surface, its weight ranking diminishes and the corresponding ring size within the model diminishes. On the other hand, we may consider an example of a need with a relatively low potency ranking, *e.g.*, the need for love and interpersonal relationships. According to Maslow, it is placed in the middle of the potency ranking. In contrast,

statistical evaluation of human needs by Bojanowska and Zalewska [23], shows that its relative weight can be as high as 0.42, thus putting it top of the weight ranking. Hence, the ring corresponding to the need for interpersonal relations will in most life circumstances have the

largest size. However, in specific situations its ranking may be altered, for instance, in the case of diving, dominant position of interpersonal relations is temporarily displaced by the more immediate need to acquire oxygen.



**Fig. 4:** A schematic illustration of momentary needs. Need categories split into distinct needs.

For the purpose of the depiction of the momentary state of human needs we propose a Dynamic Ring Model of human needs (Figure 4 (b)), which can be summarized as follows:

1. An individual has a circle (field) of needs formed by need domains: *e.g.*, physiological, safety, esteem, *etc.*. Need domains are defined by the nature of their origin.
2. Need domains contain distinct needs, with each need having a weight, which is subjectively allocated by the individual experiencing the need. In some instances, distinct needs from different domains may be similar or identical, in which case they merge.
3. The model does not distinguish between distinct needs, wants, goals, desires, and wishes.
4. An individual can have a great number of distinct needs, however the weight of most of these in given life circumstances is negligible, so that they are not detected by the individual.
5. The overall size of a circle of needs is limited and defined by the individual's psychological capacity at any given moment of time.
6. Specific needs compete with each other for attention from the individual.
7. The subjective weight of a distinct need determines the area of the ring allocated to it within the circle of needs. Rings of distinct needs with higher weight have greater thickness and are located closer to the outer perimeter of the circle of needs.
8. A distinct need's weight, and corresponding ring size, changes as a result of satisfaction, depreciation, escalation, or obliteration of a need.
9. The individual strives to eliminate or reduce distinct needs by means of their satisfaction. This is achieved by release of personal energy in the form of actions. Satisfaction or partial satisfaction of a distinct need results in a reduction of the radius and width of the ring representing the need.

10. New distinct needs appear as a result of individual ontogenetic development, changes in life circumstances, or redistribution of overall balance of needs, hence allowing new needs to pass the threshold for detection.
11. The total size of the circle of needs tends to be stable for a healthy adult.
12. Distinct needs tend to establish a stable pattern and provide a representation of an individual's personality.
13. It is plausible that throughout the life cycle the structure of distinct need patterns undergoes transformations, which are likely to be especially evident in times of crises, *e.g.*, age crises.
14. The model is contingent but not constrained to a particular theory of human motivation. The diagram presented in Figure 4 is based on Maslow's categorization of needs, as one of the typical and well-known concepts of human motivation.

The proposed ring diagram of needs is a 'scan' of the human psyche. It provides a unique depiction of an individual. The model resolves many challenges identified by Maslow himself, as well as his critics regarding the validity of his theory. The notion (a) that little evidence of the ranking of the needs exists is accounted for by moving away from any particular ranking system of potency of needs towards modelling of the instant status of needs. The same approach counters the criticism aimed at (b) the ethnocentric nature of underlying hypotheses. The model takes into account not only ethnic specific features in the distribution of needs, but also captures peculiarities at the level of an individual. Issues related to (c) questionable allocation of particular needs into some categories are resolved by reversing the process of need modelling. Particular needs are not being grouped into need categories, but rather categories are split into distinct needs, so that different categories may produce similar distinct needs, which then merge together. For example, sexual desire represents a fused need formed through the amalgamation of

distinct needs that emerged from the categories of physiological, love, and esteem needs. Finally, the idea that (d) hierarchy of needs is not universal and affected by circumstance is at the core of the presented model of needs and is wholly in line with Maslow's proposition that 'the average member of our society is most often partially satisfied and partially unsatisfied in all of his wants'.

The Dynamic Ring Model is a further development of the Ring Model of needs. It is based on the hypothesis that in normal circumstances the dominance of the need is a more important behavioural factor rather than its potency. This approach allows to explain phenomena which appear to be illogical from Maslow's point of view, such as, self-sacrifice, suicide, asceticism, extreme risk taking. The Dynamic Ring Model is harmonized with Lewin's field theory [24, 25], which proposes that needs create a 'tension system driving towards discharge and causing activities which serve the execution of the purpose'. Within the Dynamic Ring Model, each distinct need has a weight factor  $w_1$  subjectively allocated to it by an individual. The weight factor defines need importance and position of the need ring (orbit) within the total circle of needs. Distinct needs trigger actions, and the successful completion of actions results in full or partial satisfaction of a need and corresponding decline of the distinct need weight, which subsequently acquires a residual value  $w_2$  (Figure 5). The energy of the behavioural act must be proportional to both the initial need weight  $w_1$  as well as the difference between the initial and residual weight values  $\Delta w = w_1 - w_2$ . As mentioned, a single action can be related to the adjustments of the weights of several needs.

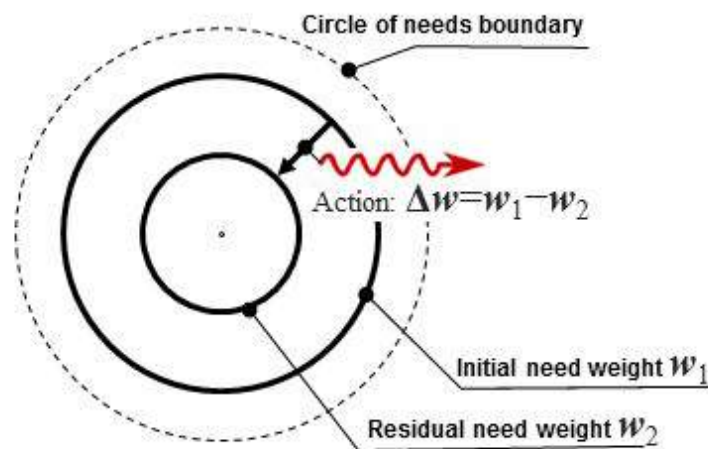


Fig. 5: Model of instigation of acts of human behaviour

The proposed model of instigation of acts of human behaviour brings the motivational algorithm to its logical conclusion by providing a link between a need and an action.

## V. CONCLUSION

We propose a Ring Model as an alternative to the pyramid of human needs. The new model describes needs categories as concentric rings rather than statically stacked layers. It contains several novel features, including its ability to incorporate quantitative weight factors in the representation of needs. This approach allows to capture ethnic or personal individualities within the structure of needs and facilitates their description in the context of comparative or evolutionary analysis. Furthermore, Ring Model makes possible the depiction of distinct needs rather than need's categories. In this layout, a rigid hierarchy is replaced by a dynamic field of needs that are distributed according to their weight (dominance), and not through potency ranking. This feature enables us to account for potential conflict of needs with dissimilar potencies. Lastly, the ability to illustrate a perpetually changing field of human needs facilitates the development of a model of instigation of acts of human behaviour, where acts are presented as functions of need's dominance.

The Ring Model introduces a new degree of flexibility to the depiction of human needs, thus resolving some of the most significant challenges identified by Maslow himself and his critics. In particular, the proposed model accounts for flexibility in ranking of needs, allow for ethnic variations, avoid misconception in allocation of particular needs into specific categories, and provides a mechanism for individual adjustments in the hierarchy of needs. The model is proposed as a new tool in research on needs and human motivation.

## LIST OF ABBREVIATIONS

SWB = Subjective Well-Being

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

## HUMAN AND ANIMAL RIGHTS

No Animals/Humans were used for studies that are the base of this research.

## CONSENT FOR PUBLICATION

Not applicable.

## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

## ACKNOWLEDGEMENTS

Declared none.

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