Associationalist Demand/Control Model (A-D/C Model)*:

With Selected Summary Draft Texts on:

THIS "PAPER EXCERPT" HAS A DUAL PURPOSE FOR THE CONDUCIVE ECONOMY DISCUSSION:

A. This excerpt provides more insight into Conducive Production's Innovation processes" (which at base are Growth processes) - from the perspective of Stress-Disequilibrium Theory" (SDT) (Karasek, 2008 paper, which has a natural science base conceptualization).
B. This excerpt also provides the social science audience a sort of "concept translation guide," explaining how the classic D/C Model Terminology: Demand/ Control/ Support (now Stablity), Strain, Active, etc. can be re-conceptualized in the context of the now vastly generalized- SDT systems-dynamics processes (p. 11).

****These texts are extracted from the draft "JCQ2 Theory Paper 1B"***
from the Job Content Questionnaire (JCQ) 2.0 Paper Group
(to be submitted for publication, approx. May 2016).

Nov 10, 2015, Robert Karasek[1,2]

This particular paper text is from a social science-focused work organization measurement instrument (JCQ2 theory background paper *(now being written).*

Thus, it addresses a different audience that the first version of this theoretical framework*: the Stress-Disequilibrium Theory paper (Karasek, SJWEH, 2008), which focused on the physiological processes involved in social causation of physiological disease, written for a medical/social epidemiological research audience.*

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Section I. The need for extension of the Demand/Control theory framework

In the last decades our global economic order has changed work organization practice in almost all counties. One important change for psychosocial work environment researchers is that the job/task part of the individual's full working life picture has diminished in importance in a relative manner, while work-related factors outside the task - both within very complex organizations and in relation to obtaining/maintaining stable work in the labor market - have become more significant. Our goal with the new JCQ 2 is to create an instrument to provide measurement for this new generation of psychosocial work environment research challenges - to address also those aspects of work experience that lie beyond the task (and now even beyond the organization), increasingly important in our real world today.

The need for such a more extensive psychosocial work measurement instrument then requires an expanded theory platform: the focus of this paper.

In doing so, we hope to open up a more robust research dialogue with social policy researchers and economists in the areas of work and employment. There are major challenges at the societal level that require better analytic models based on the social and psychological structure of work organization: (a) youth all over the world now need more jobs (cite, Oct 2015, WSJ), and for the

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elderly, and (b) in Europe for example, health care costs are becoming unsustainable (cite: OECD, Oct, 2015), many of which have a psychosocial causal pathway.

Neither of the standard solutions most often proposed for these types of challenges seem to offer sufficient solutions: neither the person-base psychological stress prescriptions, nor neo-liberal pure economic market policies. Broadening these ambitions, we could search for a linkage between innovative economy and work-related health: toward a new form of future economy addressing new social organization of work and economy solutions (for example, using the Conducive Production concepts noted: see Karasek, cite: 2004, 2015-)).

JCQ2 Goals: Further supporting interdisciplinary and multi-level work-related research ….

SECTION II. Translation from old "D/C" model to new "A-D/C Model"

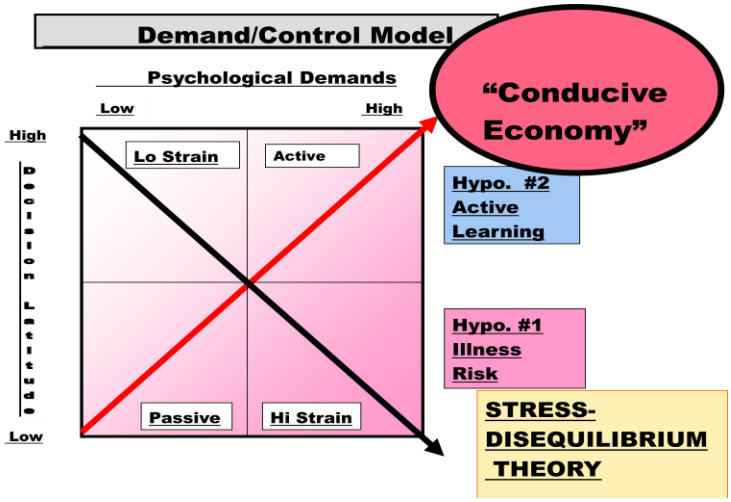
The original Demand/Control model, as measured by the task-based questions of the JCQ1, has been very broadly used and is a good base, but it is not broad enough for the goals above.

Briefly stated: the original Demand - Control (D/C) model's hypotheses use the work organization's output goals (D) and its organizational structure (C), in different combinations, as parameters to predict both positive and negative components of worker wellbeing: developmental, Active Work (the combination of high (bit not too high) Demands and high Control). and risk-prone work: High Job Strain (the combination of high Demands and low Control). ....

Fortunately, **the basic concepts of Demand and Control actually can have far more general meanings than the original task-based questionnaire scales** used in the JCQ1. This extended generality is used here in the JCQ2 to assess work characteristics at the Organizational and External-to-work Levels as well.

A. Expanded Theory Goals: the Associationalist Demand/Control Model "A-D/C Model"

This new version of the Demand/Control theory better address impacts of dynamic changes in work processes and well as job insecurity - and can still cover both negative and positive outcomes in a manner consistent with the original D/C model (Job Strain /Active Work), with hypotheses about both illness risk and growth. This is an expansion of the D/C model that includes both Stress-Disequilibrium Theory (SDT) a Job Strain extension (Karasek, 2008) and an SDT-revised Conducivity Theory (Active Work extension, Karasek, 2004a, and 2008). This integrated combination is labeled "The A-D-C Model (Hypothesis)," short for the "Associationalist Demand/Control Model)."



The new theory is evolved out of an extension of the "open-systems" perspective that has been long used by organizational sociologists - but with a significant new modification to address new challenges. This new A-D/C theory "edition," based on multi-level energy and order processes, can help describe how both health and growth are both based on platforms of stability; on energy (resource) inputs, transformations and flows; and coordination of sub-systems. This allows linkage to

the new "A-D-C" hypotheses about dynamic changes processes at the complex system level: high-level growth, high-level system deterioration, and relationships between stress and learning. These have been major missing elements in previous open-systems organizational theory.

COMING (April 2016): A further - as yet unwritten - addition to this theory will address the organizational communication linkages of this theory base. Using the "CCO" framework from contemporary organization and management literature ("Communication, Constitutes Organization," McPhee, et al, 1999), both the 'Association-of-Parts" quality of the basic "A-D/C" Theory can be retained, while a wider social-science-based practitioner audience can be accessed.
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C. Transitioning to A-D/C Model

The Demand/Control model has always spanned an important "duality:" health and behavioral outcomes were both predicted (Questions below: 1,2 and then 3 demonstrate this duality). While health outcomes (for example: job stress and disease risk) were often very person-focused, or even physiological in the recent decades of job strain medical research, the active behavior consequences involved social behavior at the individual level and above.

This article's first author first evolved this new theory approach herein in an attempt to find the answer to Question #3: How does low control cause disease? Thus, some of the narrative below has evolved from the expanded systems theory perspective first developed in physiological terms (Karasek, 2008, SJWEH, (Karasek, et al, 2010). The original D/C model was introduced (Karasek, 1976) by tests, at with sociological-level data, of the Active Work hypothesis[3].

First: what questions are we trying to answer (they must span both health and behavioral consequences of work)?

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We must continue to retain sensitivity to validation requirements of each of the levels of explanation involved: and be ever conscious of the problems of "ecological fallacy." (**see Appendix section which also addresses the Karasek, 2008 "physiological explanations.")**

SECTION III. On to Systems Theory and the A-D/C Model (..."Hypothesis ")

A. Background in Organizational "Open –Systems Theory"

We begin our new approach the theory from an organizational perspective. The "Open-systems" model (see Figure 2, **bottom half**), was originally "borrowed" from the physical sciences, but proved to have a robust history in company organization analysis (Katz and Kahn, 1966 and 1978). ....

The organizational sociologists[4] successfully used the "open-system /integrating approach" to describe the functioning of complex bureaucracies and their environmental dependencies. They were able to cover both many classic organizational behavior topics such as leadership, power, policy-making, and communication – as well as introducing new concepts from systems theory upon which they developed coherent new, but organizationally-relevant explanations (ordering capacity [neg-

[3] The original form of the D/C model introduced in Karasek (1976) was sociologically focused (and supported by four demand/control contingent sociological and psychological associations, configured into a 4-quadrant model (reviewed in Theorell and Karasek, 1996) – but it retained the above duality. The primary hypothesis was the Active Work's effects, via processes of "job socialization," on behavior outside of work; leisure and political activity (finally published decades later as Karasek, 2004c). However the author was requested, by his excellent and supportive dissertation advisors, to relegate all of the Job Strain materials to a set of footnotes - which became a parallel sub-manuscript, and the first set of hypotheses to be published (Karasek, 1979).

[4] Social-system sociologists (Luhman is a more broadly social-system focused sociologist), organizational sociologists, and in particular those work reorganization-focused sociologists (see below: Achterbergh's summary of de Sittter, Ashby, Beers, etc), have very often made use of the "open-systems" organization model. While this broad idea of "control capacity" has a long history in job design literature (de Sitter, 19_ _). However, this SDT-based approach represents a new, multi-level theory of high-level "control capacity" creation, not otherwise in the organization literature (but see below, Implications/Dollard & Karasek).

entropy], importing energy-to-order transformations, feedback, homeostasis, cycles of input, etc. See Appendix document section, Panchal, summarizing Katz and Kahn, 1966, 1978). [5]

Katz and Kahn's rich insights for classic bureaucracies was sufficient for the "mastydon, GM-like" organizational structures of the 1970's and 80's. However, the shortcomings of the Katz and Kahn formulations which were from the very outset understood to be major and have become untenably large in the ensuing three decades:

.... it could not address some of today's most important issues: (a) stress problems at work; and (b) the described structure/functions could not avoid waste human potential for creativity and innovation (the focus of our closely related Conducive Production, below). The classic D/C model and JCQ1 was used to take up the slack in the area of stress and "active" motivation for the circumstances of the 70's, 80's and 90's. But now, a major extension of both platforms is needed.

The Revision: a Multi-level Extension ***(Here we adopt the multi-level logic from the Stress-Disequilibrum Theory paper (Karasek, 2008)***

The problem with Katz and Kahn two-level model was that complex organizations represent too many level of complexity to span with such a simple construction. In the absence of a richer explanation of internal organizational "dynamics," there is - as Katz and Kahn observe – only rigid hierarchy, requiring no internal organizational flexibility – but also giving stress and allowing no creativity.

What we will have to do is to include a "mid-level" in between the System and the Environment. In doing this, we create an internal order and structure for the complex organization's "System" itself, better describing its internal functioning to achieve its complex goals in the environment.

To achieve this expansion of systems theory, **a "three-level" model has been developed,** (**see Figure 2, bottom half**) below, nesting one systems/environment pair inside another (this is a step significantly beyond the extant "systems" approaches in the physical sciences).

As noted above, all three levels are needed to understand the concept of "stress," as reasoned above. In the case of human physiology or psychology these three levels could be understood as the (a) central nervous system (the controller), the (b) physiological sub-systems (which might get "sick;" for example, the cardiovascular, system, the endocrine system, etc), and then, finally the (c) environment.

Or, switching focus dramatically: (B) for the organization this new three-level structure allows worker/management relations to be modeled: (a) the central management (as controller), (b) the employees in many departments, and (c) then the societal environment.

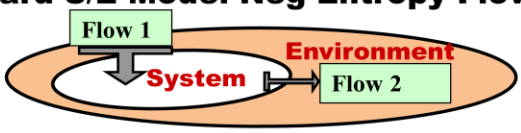
Figure 2

[5] The open systems approach has also been a foundation for the very practically efficient, but still humanistically-focused "socio-tech "work organization re-designers" (the Dutch school of de Sitter (1999)). See summary in Acterbergh and Vriens, 2010).

Extended Model: System, Environment & Controller

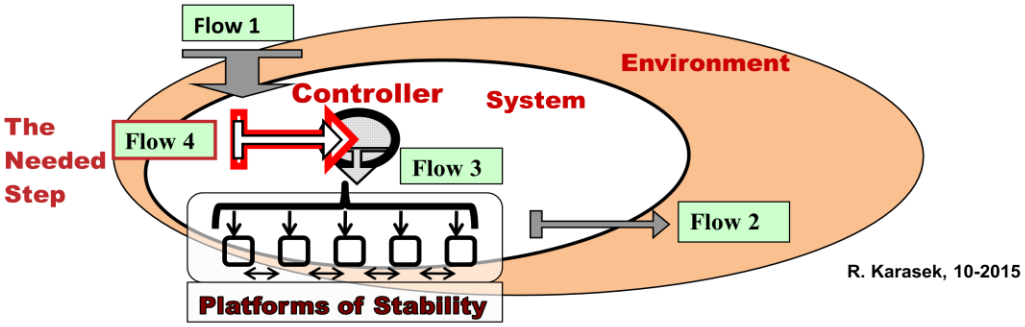
Adapting the Standard "Open-Systems" Model

1: Standard S/E Model Neg-Entropy Flows (Low Level)



2: Extended Model Theory with Controller & Hi-Level Flows

The Platform of Stability's Creation & Use of Hi-level Order Capacity requires new Neg-Entropy Flows: Flow 3 & Flow 4



Upon this new meta-theoretic platform, classic D/C Model concepts - Demand, Control, Strain, Active and Support – can then provide a familiar and easily integrated "reference base foundation" for both theoretic and empirical, and for needed new constructs, and JCQ2 scales. (Note: this "conceptual translation" is done in section __below).

Fortunately, the old and the new set of concepts are logically congruent (see below: Figures 3 and 4 Transitioning from the A-D/C Model to the classic D/C model and the Transitioning from the classic D/C Model to the A-D/C Model). Five major new mechanisms from SDT & A-D/C are: self-regulation, equilibrium, stability and insecurity, and complex-system growth, equilibrium deterioration/disease.

New Theoretic Base

Using our new systems base "metaphor" for the D/C/S concepts, we can first make a basic observation consistent with the "open systems" theory organization literature (Katz and Kahn, 1978): complex systems, both persons and organizations, must Do Work To Survive in their environments. This process involves three major steps;

(a) an organization (or person) inputs resources and information from its environment; then
(b) it transforms/processes these inputs to produce a good or service; and then
(c) it transmits this output back to the environment's customers and clients to insure the continued survival of the organization (person).

To this we now add from A-D/C "new propositions" in these areas:

(d.) The requirement to maintain "equilibriums of flows" (resources, energy), to secure "health"
(e.) This equilibrium occurs in cyclic processes of creation and consumption of (high-level)"ordering capacity" - for both health and growth.
(f.) Furthermore, by expanding the classic "open systems" paradigm from two levels to three levels, we can see how complex organisms can create the ability to coordinate their own internal systems with this "ordering capacity", so as to take the most effective actions in its environment, and from time-to-time, to grow.

---- *A. Creating High-Level Ordering Capacity*

D. How could this work?

The main challenge of healthy life and growth – for both persons and companies - is that there is a daily need for renewed High-level Ordering Capacity. You cannot keep yourself "stable" without this ordering capacity ("you" being your CNS, or the organization's central management). It is noteworthy that this requirement - has to do with "Order," and not Energy (i.e., it derives from the "Second Law" and not the "First Law" of Thermodynamics (= Conservation of Energy)).[6]

The new core explanation of the stress-disease linkage is based on the self-regulatory stability of a complex system (Karasek, 2008). This brings a new requirement: the requirement of coordination—of ordering and precision. This now becomes the determining "load" for the central control system - loads that are obviously very relevant for the complexity of our global economy. This ability to create order - Ordering Capacity[7] - is the primary mechanism by which complex systems achieve their demands in the environment. For complex organisms what is needed is Ordering Capacity available at the Highest Level of control.

We should note: the classic open-system model - with two levels: System and Environment (Figure 2, Top) - does indeed create "internal ordering capacity." This allows the organization to maintain its unique structure in the face of a inexorable universal tendency to lapse into disorder (this is the so-called "2nd Law" of Thermodynamics). But there is no differentiation here: all of the "Ordering capacity" is at the same level (i.e.: it is all Low-level).

How can we go from the development of the Low-level Ordering Capacity to the creation of High-level Ordering Capacity that we will now need?

A good example of what powerful High level Ordering Capacity will give us what Ashby describes in his description of Requisite Variety. Ashby's famous "Requisite Variety" criterion (1958) states that: only available "variety in the controller's actions" are sufficient to defeat the undesirable effects of unpredictably variable environmental challenges (i.e., hurricanes, earthquakes, ...) - in terms of preventing internal disruption to the organism.

The high level ordering capacity can allow the organism a set of "good choices:" it can the (a) individual to keep his/her physiological balance, even in the context of stressors. Or: at an organizational level: the companies management can maintain internal operating stability even in the context of external challenges.

Thus: it is limitations on Ordering Capacity are unhealthy for the individual and unhealthy for an organization – but also inevitable, as the resulting cost of maintaining a stable day-to-day existence. The issue is the LIMITS on (High-level) Ordering Capacity. We must create MORE of it, to thrive or even exist in challenging circumstances. How shall we create enough of it?

The broad idea of "control capacity" at the organization's management levels has a long history in job design literature (de Sitter, 19__). However, our approach would represent a new theory of high-level "control capacity" **creation**, which is not otherwise in the organization (nor other) literature (but see below, Implications/Dollard & Karasek, 2010).

E. The Needed New Step: Creating High-Level Ordering Capacity Health and Growth

Here is how it could work: To begin; first one system/ environment "pair" (fx: the top "pair" of Figure 2) has to be "nested" inside another S/E "pair" to develop the needed three-level model (Figure 3, Bottom).

But this in turn leaves an extremely important "missing link" question - which is not even addressed in the physical sciences[8] (!). How can we go from the development of the Low-level

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[6] This means, for example, that if we ask the question: "How shall I keep myself stable in the context of a very uncertain global environment: Shall I just eat more candy bars?" The answer is "NO." While you do need energy, you need even more than that: you need ORDERED energy (WORK), not "just" energy in a disordered form.

[7] Ordering Capacity is termed "Neg-Entropy" in much systems dynmaics literature, and also in Karasek, 2008).

[8] Even the most advanced modern physics seems to have no need for the complex modeling almost always needed in the human or health sciences. For example: Stephen Hawking's most sophisticated current Second-law related attempts address radiation from Black Holes and some complexity in their structure, (cite: video/article, B__-Hawking radiation, 2015). This is moving indirectly toward a higher level of organization, but not quite "getting there" - as yet at least.

Ordering Capacity, to the creation of High-level Ordering Capacity - while still respecting the requirements of energy and order transformations?

To make this happen: First: inside the System there must be a "Processing Structure" which transforms DISORDERED ENERGY— with many degrees of freedom — into ORDERED WORK — at few degrees of freedom: i.e., accurate predictable Work.

How to do this? In summary: the Work Output from one level (the lower level) does this by providing and creating the Constraint Structure, that is used to restrict the degrees of freedom of the cheap, disordered energy that is available at the next higher level above. And thus it turns that disordered energy into High-level Work (in Figure 2, Bottom, this is represented by the Red-arrowed Flow 4). For more details: see Karasek, 2008 p. 122, Figure 2, and text):[9] Thus, the processing structure is "built" using the critical outputs from the lower-level systems as components: this is the critical new idea.

To give a very simple metaphor: it is like the steam engine: which is a higher-level system built to "constrain" the disordered steam energy in such a way that we can get predictably, ordered work output. This "constraint" occurs utilizing the very, very carefully designed (it took a century) mechanical parts of the steam engine which insure that it is only the high-level, precise and powerful, Work that occurs the back-and-forth powerful stroke of the piston. We do not get random explosions, or unexpected movement (Of course to achieve this predictability while retaining the "power," substantial amounts of the input energy are lost as expelled "waste:" becoming random energy again).

Thus, the Demand/Control model's new theory extensions use this creation of High-level Ordering Capacity and thus push the systems dynamics "methaphor" very significantly beyond physical science's standard "system/environment" paradigm. The new, extended theory is grounded in an extension of the Very Generalized set of limitations on processes that transform generally available Energy/resources into the very specifically Ordered Energy/resources we need to do as Work (the so called "Second Law" of Thermodynamics).

But we must note: this gain brings with it New Rules of the Game. It requires a constant ("daily") creation of High-level ordering Capacity - not just the simple, "Low-level" ordering capacity that would be the outcome of the classic S/E pairs in either the physical or social sciences (i.e.: photosynthesis, ATP, well-monitored and highly productive assembly line work, etc.).

Each Higher-level of Ordering Capacity[10], as shown in Figure 2, leads to inevitable "efficiency" losses, as the target action in the environment is approached. If the final output of the organism/organization is to be both very precise and very adaptable to the environment, it requires Ordering Capacity at the highest level and this comes at a cost of very much higher "input" of resources.

Several important topics:

.... NOTE: the order of the original Draft Paper sections is modified here: repeating here sections, that will also appear below

A. The Cyclical Nature of Demands: Build-it-up, Use-it-up.

Additional Demands Implications from the "system-theoretic' perspective.

Demands explanation involve the continual process of turning "cheap" (disordered) energy and resources abundantly available in the environment, into the highly specific energy ("Work" – of all types) needs for effective functioning of the organism/ organization, as it attempts to achieve its own very specific goals - just as the steam engine turns disordered, (cheap) steam energy, into precisely defined and powerful, one-dimensional motion (predictable enough to power trains,

[9] This is called Flow 4 in Karasek (2008): "The Neg-Entropy Pump") [43]. This processing structure is "built" using the critical Outputs from the lower level systems as components. Thus, the low level contributes to the development of ordering capacity development at the higher level (i.e. to take a physiological example: the outputs might be enzymes, which at the next higher level are used to process simple input molecules ("substrate") and energy (ATP) into the complex proteins needed for Work by the organism (Karasek et al, 2010).

[10] As noted in Karasek, 2008: the mammals with their self-regulatory stability and just-enabled flexible behavior, consume over 10 times the food energy per unit of body mass as reptiles who lack this adaptive power (i.e., cannot regulate body temperature). Figure 2 shows the "waste energy loss" at each successive Neg-Entropy pathway transition.

weaving mills, etc). This is done in cycles of building up "ordering capacity" (during periods of rest) – and then using up this capacity to meet the challenges of daily life. This process is cyclical. The notion is that cheap disordered energy is processed daily - or at some cyclic interval – is of course similar to the stream engine's cyclical function. When this happens "smoothly," it results in an "equilibrium of flows."

Since no complex organisms exist without flows, a continual input and output of energy (nutrients, money, etc) from their environments, none exist without demands.[11] What could be stable then is the internal conditions these flows create, and the consistency of the actions the organism takes in its environment to maintain its "equilibrium of flows:" these could be stable.

There is a very important implication of this claim: **there is no possibility of doing Work without the possibility of Rest (over a longer time period); nor for sustainable growth, innovation, or creativity.** This "restoration" requirement of all life generates "a balance" in life activity (a balance between production and rest, the needed balance of sympathetic and parasympathetic activity in physiology), which seems to entirely forgotten in our modern global economy, at least at the social policy debate level.

B. Control and Degrees of Freedom of Action and Response

To get its jobs done, the person or organization must exert "Control" over/or within its environment. First, control refers to the specification of the precise combination of actions that the organism is required to undertake to gain its needed resources in the environment.[12]" Ordering capacity is "used up" as the organism does the needed extensive coordination of internal physiological processes is required for individual behavior and complex social interactions. The complex organism internally coordinates its diverse subsystems into an effective overall "environmental action" (i.e: like an army coordinating its troops and armaments for a successful battle). All represent "Work" according to the aforementioned definition, channeling energy with many degrees of freedom into the constrained release of the energy into a few degrees of freedom—embodying information about just the right time and place and the like. In systems terminology: the system creates the "order" that it wants in its environment – at the expense of increasing its internal disorder - increasing its internal entropy (reducing its Ordering Capacity, i.e., decreasing its internal Neg-Entropy).

Also, using its Skills and Degrees of Freedom (autonomy), the organization – or the person - functions externally in the environment (via, i.e., its Decision Latitude) to grab cheap available resources/energy at one level in the environment and converts it to building blocks for action programs at a higher level (creating new "Ordering Capacity"). This allows the organization/person from time-to-time, to integrate a new source of external "resources," creating "meta-skills,"- for growth. The autonomy described which would be a part of Conducive Production, would be at the very highest level of Hacker's (2002) Autonomy and Freedom scale (check label/) from "action theory"), and perhaps require the "decentralized" internal organizational structures noted in Theory Paper section__)

C. Maintaining stability: "Organizational homeostasis"

An important additional concept, for living systems, is that higher-level structure needs to contribute "a stable context" for lower level systems to function. Once lower-level system are effectively function, then they contribute a surplus that allows the higher-level system to function effectively (this integrated function is termed "homeostasis" in physiology[13]) - and from time-to-time,

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[11] No complex organizations are therefore either truly totally "stable" (totally stable forms are "dead").

[12] Control in this discussion means the ability of the"controller" (CNS, or management) to maintain the organization of the subsystems of the organism in the context of facing an adaptive challenge. "External control limits" could measures the limitations of the "degrees to freedom" of the organism to operate, as determined by factors outside the control of the organism in its environment. For example, external organizational or environmental restrictions can interfere with the execution of the strategy that the organism has chosen—or—they can limit internal physiological possibilities, limiting internal control (ie, self-regulation). Or alternatively, human beings (or companies) are such effective self-regulators that they can sometimes exercise control over their external environments. The organism can periodically control its own behavioral context to permit, for example, long-term rest and sleep without threat.

[13] A. For Health/Disease ---"... This basic relationship helps to define the nature of multi-level control processes. These relationships are very similar to Bernard's "homeostasis" concept. Ordering capacity restoration occurs

growing. This might be considered a type of" organization-level homeostasis." Thus, the low level contributes to the development of ordering capacity development at the higher level.

At the organizational level: companies will provide not only heat, light, and internet so that employees can be productive, but perhaps also free cell phones, and day-care services for children. In turn, healthy, well-motivated and supported company employees can generate a surplus for the company. And so on.

--- B. Model of the Growth Process: A Basis for Conducive Development

3. Organizational Resources and Individual Skill Development: Conducive Production

Organizations constantly search for new ways to acquire resources: thus encouraging new customer '"demand' for company products is a persistent theme. However, our new approach brings a new focus: linking individual skill development possibilities to very specific customer demands in Conducive Production.

Here, there could be worker-customer "micro-level' of environmental resource generation for the organization in quite decentralized organizational structures - which also involves "conducive growth" of worker skills and capabilities. This would involve new forms of relations of creative coordination/ communication to support customer-adapted production. While definitely a "new resource" generator for the organization, the small scale of the customer-adaptation" structures involved could require a "re-linkage" into the larger-scale organizational structure – these in turn could require a dynamic, multi-level environment/system linkage model, such as that above.

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Further development in this direction could support investigations of new economic policies to support both healthy work and reduction of stress-related health risks. This could be a useful connection to labor and economic policy makers.

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D. New Model of Growth Processes in A-D/C: "Growing" the Platform of Stability – and beyond to Conducive Production

What is sought is Growth of the overall level of stability, that is: Growth within a Stable, multi-level context (.....). In the "A-D/C Model's" the organism/organization's growth potential is formulated in terms of:

(a) Platform of stability/ equilibria of flows;
(b) Then: the search for possibility of accessing "new "energy (resouces) sources in the environment;
(c) Then acquiring the external energy/resources and bringing them as inputs into the system
(d) Then "processing" them: appropriate re-organization of internal capabilities (a re-division of labor, upon a platform of some stability), such as in the Needed New Step above.
(e) Once such new inputs are successfully processes in this manner, then "a new level of capabilities" is achieved by the complex organization: growth has occurred. Higher levels of ordering capacity could now be routinely created. And upon that "elevated" platform, eventually an even further cycle of growth could occur.

Addressing the practical challenge of "How" to build (and grow) requires the dynamic organizational processes of the A-D/C Model to supply the "general-level" hypothesis that (a) can be translated into specific for many work-related groups, and (b) insures that overall hypothesis have some consistency across groups, to facilitate "boundary spanning" dialogues (see discussion Section__).

Conducive Production and Micro-level Environmental Adaptability

What about the original "open-systems" limited coverage of creative input of individuals in their organizations? There is no question that the systems model requires that the organization to get

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from the lower level, and thereby supports adaptive actions that are controlled from the level above (higher in energy).

energy (resources) from its environment. However, the context of the original system theory bureaucracies – where often the product was a single mass-produced output (a car , a TV) - the issue was internal efficiency (or - manipulation of the market). Thus, in the open system model as used by socio-technical work design experts, irregularities from the environment - for example specific customer requirements – are often seen as "disturbances" - to be reduced to promote internal organizational efficiency.

However, in our new world of work, we both have a very diverse set of customer distribution channels, very diverse need-groups – and now, perhaps even more important, a vast need to "validate" social engagement and utilize the social capital of youth: to provide meaningful work for youth around the word (cite: new report intro..). We need "more work" for the society as a whole: but in the form of "smart jobs" that lead to future careers (of course which are market-feasible, in some manner).

The D/C model's Active Work ideas can be extended to Conducive Economy: a form of economy based on skill development. Conducive Economy links development of customer's wellbeing and capability development to jobs requiring intelligence and creative flexibility (Karasek, 1999, " Alternative Economy," 2004b). The output of Conducive Productive is a "tool-like" contribution to the customer's growth of capabilities – and a utilization of high-level skills by workers involved in the production/ service.

In this model skills bring with them a "need" to be used[14]. Such needs are of course supplementary to biological needs, but could underpin a new stage of economic development. These needs are the drivers that support a healthy new social dynamic linking creative actors in a new, Conducive Economy - keeping the economy "alive."

New JCQ2 scales are developed to assess this capacity in jobs and in organizations.

E. New Model of Stress Processes in A-D/C: Stress and Disease Processes

Stress is defined as the inability of control system to maintain coherent regulatory stability when facing complex adaptive demands because of insufficient ordering capacity (often a transient condition. It represents an overload capacity in the central control system's ability to control its subsystems to ensure effective functioning. When this overload lasts for a long time, an alternative, support resources are exhausted, further high-level performance becomes too 'costly and the system descends into a temporary "chaos state." It will likely soon emerge form chaos, and attain a new equilibrium: but now it is an equilibrium with a lower-level of capabilities for effective action in the external environment (this is defined as "chronic disease," the opposite of growth).

F. Summary A-D/C Model: A New "Associationalist" D/C Platform

Altogether, the two extended theoretical frameworks: Conducive Economy (Active work extended, and now modified with SDT constraints) and Stress-Disequilibrium Theory (Job Strain extended) comprise the extended and generalized "Associationalist Demand/Control Hypothesis" (A.-D./C. Hypothesis) – which is consistent with the original DC model. These major extensions incorporate new, multi-level system theory that can span individual level, task-level, organization-level, and external socio-economic factors.

The principles evolved will hopefully provide a broad enough framework for understanding both how systems – both at the organization and at the organism level - can re-organize themselves and grow into higher levels of complexity (the Active Work hypothesis - now as Conducive Production), and how systems can dissolve into "diseased" versions, with lower levels of complexity (the Job Strain hypothesis - now as the Stress Disequilbirum Theory (SDT)).

The Associationist version does not contradict previous demand–control hypotheses. The extensions expand the original vocabulary of the demand–control model beyond the large company and national labor relations framework (social welfare state background) from in the 1950's through the 1980's. That version of these general principles created the work-characteristic definitions used in

[14] (see Footnote # __)This is one of the cross-platform examples of need to be careful for ecological fallacies. This requirement of course could only be relevant for sentient human beings. Forms of system models with non-human membership could not have such a requirement).

testing the original demand–control model and measures of job conditions in large companies (where it takes a specific form in the widely used Job Content Questionnaire JCQ 1.0).

A.-D./C. hypothesis has a logical core that supports far more general approaches than the original D/C explanations, with basic principles based on the association-of-parts and coordination processes – no longer exclusively on specific Material Properties of Things - with the dynamics of such interactions are determined by limits imposed by the Second Law of Thermodynamics. Clearly, "coordination-of-parts" is the key concept for both stress/disease and growth. Thus the new label: the Associationalist" D/C Hypothesis (A-D/C Hypothesis).

We have labeled it a "Hypothesis" (instead of a "Model") because of its broad scope, and because if its so many of the claims, at so many levels, will require further validation. This lack of current full validation is of course not a reason for abstaining from constructive attempts at the now pragmatically necessary multi-level, multi-outcome problem solving.

A General Limitation of the A-D/C Hypothesis:

In spite of the above inclusiveness, it will continual to be a limitation of both the D/C Model and the new A-D/C Model that they do not cover equity-related social relationship in as basic a manner as for example Siegrist's Effort/Reward Model (and the work of Rawls, cite__). Those concepts of social equity, fairness, and respect, represent deep, but separate sociological tradition (for example Hegel's "blood struggle for respect," as reviewed by Fukuyama (in cite __)).

G. Finale: The potential benefits from the new "A-D/C Model":

We list below some of the new concepts that are now available in the D/C Model which are now included in the "A-D/C" Model (Associationalist Demand/Control Model):

1. SELF-REGULATORY STABILITY as a platform for both Health and Growth.
2.There can be NO WORK WITHOUT REST (OR SUSTAINABLE GROWTH, OR CREATVITY)
3. DEMANDS viewed as continual (cyclical) transformation of Energy into Order (Work).

An "outline" for HIGH-LEVEL ORDERING CAPACITY CREATION.

4. SKILLS and CONTROL as parameters of ordering capacity creation and use.
5. Multi-level (nested), CONTROLLED/ CONTROLLER RELATIONS.
6. PLATFORMS OF STABILITY (equilibrium of flows).
7. HOMEOSTASIS (at multiple levels): Higher-level and Lower-level synergistic relationships
8. Multiple regulatory processes for "Platforms of Stability."
9. Human motivational "NEED TO USE SKILLS – as economic dynamic driver
10. STRESS: an overload of the central controllers coordinating capacity, when facing external demands, which can lead to permanent capacity loss if sustained.
11. GROWTH: an opportunistic process involving incorporation of external resource, and requiring an internal "re-division of labor" of internal capabilities, yielding new possibilities for adaptation in the external environment.

.....Return to Draft Paper Structure...

Section IV. On to "A- D/C Model's" Generalized Dimensions: Demands, Control and Social Stability

New Demand/ Control/Support Macro-level Definitions

We must now transform the concept of Demands, Control and Support to take advantage of this new approach. Houtman gave a clue to transitioning the D/C model at the Berlin JCQ2 Workshop (October, 2102): "...Demands refer to something "External" to the organization/ environment (to be effective addressed/ transformed), while Control and Skills are "Internal," relating to structurally developed capabilities so far attained by the complex organism..."

We begin by describing the General version of the D/C/S constructs from the perspective of psychosocial work environment assessment. Then in sub-sections, we noted some of the particularly relevant implications that could be added from the "system-theoretic' perspective. A visual

understanding of the "transitions" from the classic D/C to the proposed A-D/C Models, going in both directions, can be gained also in Figures 3 and 4.

A. AREA I: Demands

First, we redefine "JCQ2 Demands[15]" - beyond our classic D/C model's "too high" or "low/OK", depending significantly on the degree of employee control involved (but in a manner that remains consistent (see Paper1B, section _, Figures 3 and 4, p._) We here utilize the new conceptual structure, which can support multi-level assessment:

> "Demands are the requirements for activity, anchored in the need to gain input resources from the external environment (or social structure), which allow the individual to apply his/her own unique input-to-output transformations to those inputs, performed in such a manner to insures feedback from the environment, and insures further cycles of resource input from the environment."

In the context of the JCQ2 it is the individual's job that is the source of the resources and inputs, which is the employees skill application area, and is where expected "output" is to be delivered, and from which the individual expects, along with feedback, to retain further employment in the "role." (For organization level assessment, see discussion below: __).

(Repeated from above)

Additional Demands Implications from the "system-theoretic' perspective.

Demands explanation involve the continual process of turning "cheap" (disordered) energy and resources abundantly available in the environment, into the highly specific energy ("Work" – of all types) needs for effective functioning of the organism/ organization, as it attempts to achieve its own very specific goals - just as the steam engine turns disordered, (cheap) steam energy, into precisely defined and powerful, one-dimensional motion (predictable enough to power trains, weaving mills, etc). This is done in cycles of building up "ordering capacity" (during periods of rest) – and then using up this capacity to meet the challenges of daily life. This process is cyclical. The notion is that cheap disordered energy is processed daily - or at some cyclic interval – is of course similar to the stream engine's cyclical function. When this happens "smoothly," it results in an "equilibrium of flows."

Since no complex organisms exist without flows, a continual input and output of energy (nutrients, money, etc) from their environments, none exist without demands.[16] What could be stable then is the internal conditions these flows create, and the consistency of the actions the organism takes in its environment to maintain its "equilibrium of flows:" these could be stable.

There is a very important implication of this claim: **there is no possibility of doing Work without the possibility of Rest (over a longer time period); nor for sustainable growth, innovation, or creativity.** This "restoration" requirement of all life generates "a balance" in life activity (a balance between production and rest, the needed balance of sympathetic and parasympathetic activity in physiology), which seems to entirely forgotten in our modern global economy, at least at the social policy debate level.

B. AREA II: Control

[15] In the classic Demand/Control, with a less rigorously formulated perspective, demands, for example, can be "too high," leading to risk of disease - or if "not too high" be possibly on a pathway of growth: with the outcome depending on whether the demand process is controlled by the organization/ism for its optimal wellbeing. The category "too much" also depending on sophisticated physiological, psychological, and sociological analytic criteria that was not then provided, but which is now needed in the context of more multi-level work environment analyses. From our practical viewpoint with the JCQ2, we can say that responses to simple questionnaires about whether "your work" requires you to "work fast," at least seem to allow useful data collection for research and practice at the worker's Task level (and a similar approach underlies much of the other published literature in the Demand/Control area).

[16] No complex organizations are therefore either truly totally "stable" (totally stable forms are "dead").

The process by which the "organization/organism transforms the disordered resources /energy from the environment into the ordered "output product" that it needs, involves Control and Skills - the other "branch" of this generalized Demand/Control formulation.

The person's control over the strategies he or she has developed to maintain the stability ("eqiilibrium") of "flows" (i. e, flows of good, nourishing things: money flows in the door, rent flows out the door). What is important is that the input and output flows are in balance as the person interacts with the environment. Maintaining stability of flows for self and for families is always the major "control" challenge of adult lives.

Thus our new formulation for "control" in the JCQ2 Decision Latitude (see Theory Paper 1B: Section_) is: "

> "..the freedom for people to act using their repertoire of skills within the social structures in which they have made their main investments and have gained their major life-sustaining rewards." This could reflect workers' maintenance of an "easy equilibrium" in daily life.

In the context of the person, for example control at work, the individual must optimally process and utilize its input resources, in terms of its own optimal strategies:[17] ("I did it my way..)." From the perspective of the individual worker, "control" also can refer to the internal constraints that represent the organization's "rules of work process," which can also limit individual options (Katz and Kahn's work role requirements, company norms and values). Such meanings are often reflected in the JCQ2 organization-level scales. The JCQ2 includes __ task level and ___organization level scales to help measure these concepts: as discussed further in Section __, below.

"Skills" are the "tools" and capabilities developed by the organism to successful dealing with its environmental challenges (ability to gain sufficient resources/ energy).

(Repeated from above)

Additional Control Implications from the "system-theoretic' perspective.

To get its jobs done, the person or organization must exert "Control" over/or within its environment. First, control refers to the specification of the precise combination of actions that the organism is required to undertake to gain its needed resources in the environment.[18]" Ordering capacity is "used up" as the organism does the needed extensive coordination of internal physiological processes is required for individual behavior and complex social interactions. The complex organism internally coordinates its diverse subsystems into an effective overall "environmental action" (i.e: like an army coordinating its troops and armaments for a successful battle). All represent "Work" according to the aforementioned definition, channeling energy with many degrees of freedom into the constrained release of the energy into a few degrees of freedom—embodying information about just the right time and place and the like. In systems terminology: the system creates the "order" that it wants in its environment – at the expense of increasing its internal disorder - increasing its internal entropy (reducing its Ordering Capacity, i.e., decreasing its internal Neg-Entropy).

Also, using its Skills and Degrees of Freedom (autonomy), the organization – or the person - functions externally in the environment (via, i.e., its Decision Latitude) to grab cheap available resources/energy at one level in the environment and converts it to building blocks for action programs at a higher level (creating new "Ordering Capacity"). This allows the organization/person from time-to-time, to integrate a new source of external "resources," creating "meta-skills,"- for growth. The autonomy described which would be a part of Conducive Production, would be at the very highest level of Hacker's (2002) Autonomy and Freedom scale (check label/) from "action theory"), and perhaps require the "decentralized" internal organizational structures noted in Theory Paper section__)

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[18] Control in this discussion means the ability of the"controller" (CNS, or management) to maintain the organization of the subsystems of the organism in the context of facing an adaptive challenge. "External control limits" could measures the limitations of the "degrees to freedom" of the organism to operate, as determined by factors outside the control of the organism in its environment. For example, external organizational or environmental restrictions can interfere with the execution of the strategy that the organism has chosen—or—they can limit internal physiological possibilities, limiting internal control (ie, self-regulation). Or alternatively, human beings (or companies) are such effective self-regulators that they can sometimes exercise control over their external environments. The organism can periodically control its own behavioral context to permit, for example, long-term rest and sleep without threat.

---- *C. Platforms of Stability (Equilibrium of Flows)*

C. AREA III: Social Stability/ Support

Social support-related concepts are anchored in a much more basic manner in the new more general A/D/C Model, via the construct: Platforms of Stability, than was the case in the original D/C model. It is based on the result of maintaining the above-noted "equilibrium of flows." Platforms of Stability can refer to organizational contexts that provide a stable basis of action for working persons (or to organizational sub-systems interactions would also be covered). This new stability construct is consistent with the organization level goal in the A-D/C Model:

> "In the context of a complex organization/ism, we will attempt to use Demand and Control concepts to describe how to maintain Platforms of Stability – first to maintain health (anti-stress/disease), and secondly to support "growing" of these platforms."

From the employee's viewpoint, our version of Platforms of Stability platforms represent an answer to the question" "What allows you to get your "core job tasks" done – on a daily basis without overload?" And what allows the security in knowing that one's contribution will be "cyclic:" that the contributions /rewards can continue on into the future, to allow both the employee and the organization to develop optimal long-term benefits.

However, the construct changes its meaning somewhat from its original D/C/S version. It is now evolved from the systems dynamic formulation: Equilibrium of Flows– in the new version of the Demand/Control Model (A-D/C). (Some related concepts are Dollard's "Pschyosocial Safety Climate; (cite, 2015). The processes of creating "social capital," also can be developed on the basis of this conception; Karasek, 2004 b; see also footnotes in Putnam, 1999; and Danish cite 201_: how long it can take to create this "reserve" capacity.) (Note: the above discussion also indicates that "social capital" of this form (high-level ordering capacity "reserve"/ resource) can also be "used up/ depleted:" which has become a risk in some Scandinavian contexts: __cite). .

Thus, Platforms of Stability do NOT refer to the "rigidity" of all of the existing bureaucratic structure, regulations – or even what is conventionally referred to as the existing" organizational climate. Those are indeed stable structures in many cases – but they are NOT necessarily the best stable structures to provide a good platform for either stress prevention of innovative work/ growth for the company.

Evolution from Social Support (to current Platforms of Stability)

2. Unfortunately, as this new approach moves to the "higher-level, it looses some of the social-relational richness of the original Task-level social support concept (below; Johnson, 1982),[19] for example, relating to interpersonal emotional stress buffering (but the JCQ2 task-level scales retain this focus). And both the D/C and new A-D/C model overall fail to cover well the area of social equity, and trust, fairiness (cite__). . However, the JCQ2 does include some "respect" questions at the task level inspired by Siegrist (ERI cite__), and a Rewards and Fair Distribution organization-level scale.

3. The Scandinavian social welfare political and economic support built a foundation for work stress and humane work design inquiry (Lysgaard (__), Gardell (__), and Gustavsen (__). The strong correlation between "decision latitude and social support in the D/C and other literature was associated with "participative decision making" – and can be easily understood in that context as anchored in an organizational context: (thus: the JCQ2 construct of Organization Decision Latitude) was an easy extension from the Task level, and of course illustrated a strong Support/ Control linkage at the organization level.

[19] The original addition of social support came at the impetus of Jeff Johnson (w/ E. Hall), in about 1982, who considerably added to the body of research, beginning what might be called the Demand/Control/Support model "era." That activity was in turn based upon U. of Michigan Researchers (J. House, et al, 19__) studying stress coping, with emotional coping buffering processes for job strain effects highlighted (Karasek, Triantis, and Chaudry, 1982,).

The JCQ2 includes seven organizational level scales to help measure a full range of the states of organizational processes, including two specifically in this area: discussed further in Section __, below.

D. Classic D/C and new Assoc.-D/C – Diagramatic transistions

SECTION VI. THE JCQ2 Papers: CROSS-PAPER DISCUSSION AREAS:

1. The JCQ2 Organizational-scales: three interpretations of structure.

JCQ2 Paper 3A shows the empirical validity of assessment at the Organizational level of three independent macro-level scales: Organizational Control, Organizational Demands, and Organizational Support – as "super-sets "of the JCQ2 Recommended Research scales from JCQ2 Paper 2. These macro scales are similar in concept, but empirically separate from the Task-level Demand/ Control/ Support aggregate scales. ...

Dextras-Gauthier, et al, (2010) reviews the often-used Competing Values Framework in organizational theory literature, which employs a conceptual framework partially similar to ours in Figure 3 (bottom). Its two-dimensional framework has one dimension that reflects "stability, order and control" vs. "flexibility and change:" which is similar to the main Stability/Change arrow in Figure 3. The second dimension of this framework differs somewhat from ours: the "internal harmony" end of its scale is close to our social stability and its "external focus," in our framework is common to all organizational structures. However, Schein's (1996 – check this -) use of a multi-level framework to describe organizational values more closely reflects our multi-level organizational formulation.

3. Differentiation: We can make use of the content differences between the scales – in a manner consistent with the empirical findings of Paper 3A - to support an even richer, if partially speculative relationship between the scales. The "Spectrum Schema," (Figure 3, - bottom), introduces a circular spiral running from: (a) positive change, through (b) protective stability, through (c) negative, disruptive change. The Spectrum's circle is really a SPIRAL: the circle does not close. So at the "split point" the ends of the circle do not come together, instead they actually spiral upward - for positive change and growth in capacity; or downward – for negative change, implying reduction in organizational capacity). This shows that "change" can be either positive (growth/ "conducive development") - or negative (decline/disease). The schema also highlights the need for an additional scale in the current in JCQ2: new Organization Stasis (Calm) Scale, which would be on the opposite, Stability side of the figure (such a scale is not in the current JCQ2 Pilots. It could possibly be indirectly measured by the absence of positive and negative change).

The schema roughly illustrates how the new A-D/C theories can be used to extend work-related growth hypotheses; going into more positive "work condition" extremes beyond Decision Latitude and Active Work to Conducive Communication (and its skill-related outputs), and then suggesting how "risk of deterioration/illness" in an organizational context can extend beyond Job Strain/Demands to more negative extremes involving system dissolution - in the form of Organizational Chaos (which might be considered equivalent to chronic disease at the person level).

While we have not preformed empirical testing to fully validate the precision of this "spiral form" (nor do we know how we could do that), we do find empirical support for the presented "ordering" of the scales, even beyond the significant support of the structural equation modeling of the D/C/S structure for the organizational level dimensions (German Pilot) in Paper 3A.[20]

Also the Spectrum Schema, can provides a simple integrating "image" for the new Stress-Disequilibrium Theory, Conducivity Theory dimensions of the original D/C/S model. To demonstrate this relationship to the classic Demand/Control quadrant model, we must use some artist license and "tear apart" the two D/C high demand quadrants, transforming the well-known Quadrant D/C model geometrically a spiral, also. This reveals: (a) positive changes in the active direction (leading to a

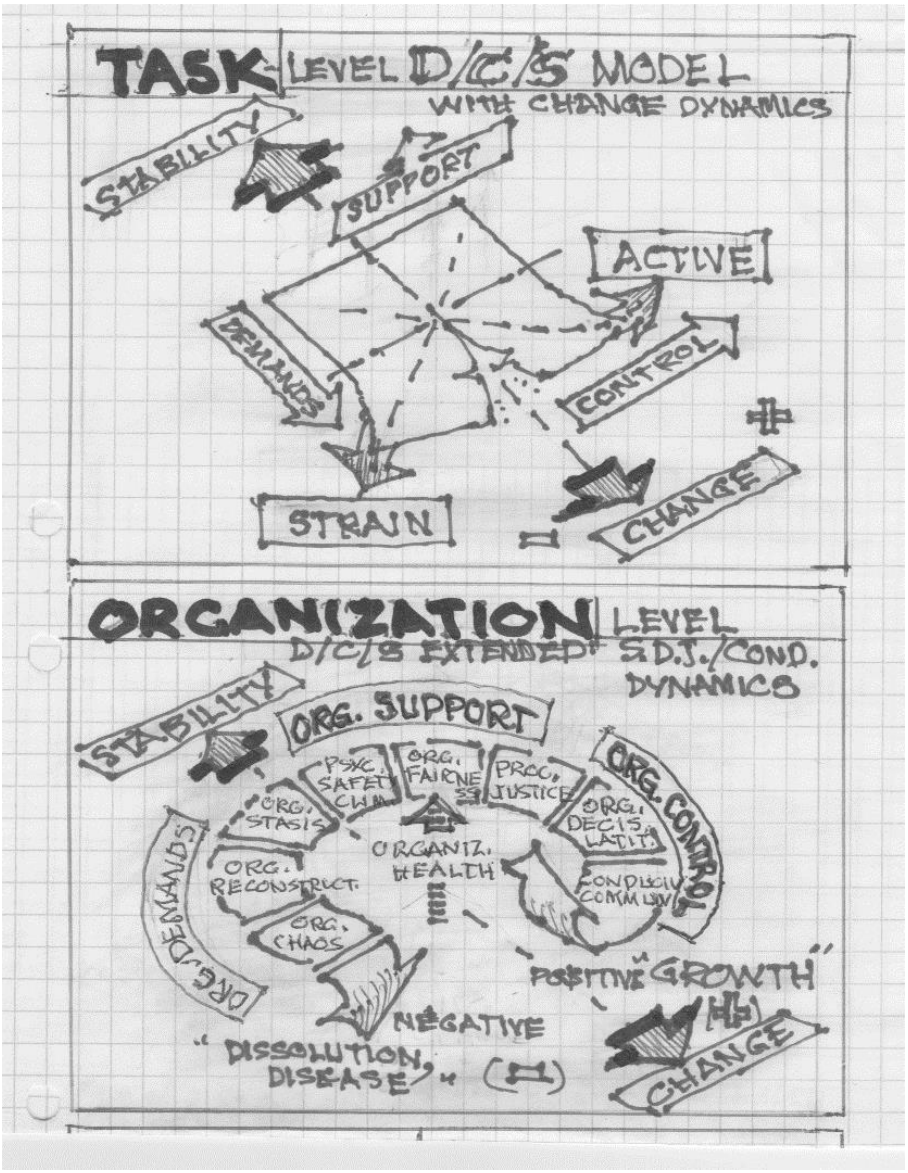
[20] Additional empirical findings are that: Organizational Fairness and Psychosocial Safety Climate are specially highly correlated (.62). In addition, the SEM model that includes Conducive Communication as an Organizational Control indicator (with Decision Latitude and Procedural Justice) is the strongest model. Alternative models that include Conducive Communication with Organizational Support are not "good fit", nor are models that include Procedural Justice as an Organizational Support indicator (as opposed to an Organizational Control indicator). On the Organizational Demands end of the 'spiral" the associations are somewhat less clear (the correlation between Organizational Restructuring and Organizational Chaos is .35: only moderate (however, the restructuring scale has only 1 item in the German Pilot).

multi-level upward "growth" spiral in terms of capabilities) and (b) level changes in the job strain direction (leading to a multi-level downward "disease-risk spiral in terms of capabilities).

However, this implies a major differentiation of work effects is on the "high demand side" - going from positive (at active work) to negative (at high strain work): but this means that effects are Zero in the middle at the demands axis. We do indeed find that this "discontinuity" or "axis bend" is consistent with major social status differences, and an important issue to be further considered[21]. (However, it is not yet generally confirmed that association with dependent variables and control are stronger at high demands than at low demands. Further testing, under a diversity of conditions, could be relevant here).

Figure 3 (Transitioning from classic D/C Model to A-D/C Model)

[21] In fact, it has long been known (Karasek, 1976) that there are consistent macro-properties of the classic D/C model that also reflect this 'tear." The distribution of wellbeing in a Psychosocial Social Class model (Karasek, 1989, BK Choi, 2008)," - i.e.: a new class structure - reflects a non-linearity in the D/C model. First, there is class differential from High Strain to Mid-population, and then another class differential from Mid-population to Active Work (top) - but this second social class gradient (Karasek, 1989, Byoo Kyoo Choi, et al 2007(2008a) is in a perpendicular direction to the first. Thus, this is not the simple, unidimensional, "vertical pyramid" of the material wellbeing class structure (i.e. that based on income). Thus, what we might want to call the new "overall social class gradient" bends" in the middle of the 4 quadrant model population: going from the lower right (low class); to the center of the model (middle class); and then up into the upper right corner (highest social class).



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(Transitioning from the A-D/C Model to the classic D/C Model)

2. External-to-work factors, Stress and Global Economy/ Work Organization

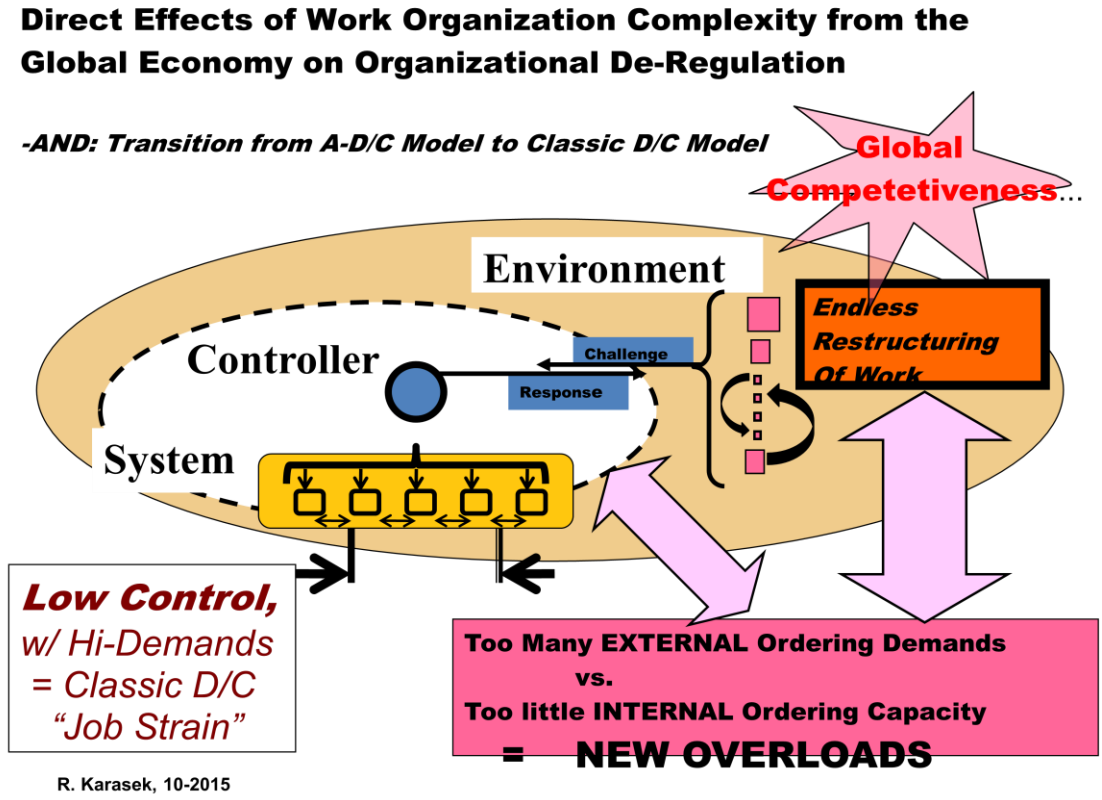
Our tests of JCQ2 External-to-work factors allow is to get a clearer understanding of the true costs of global economy. The global economy complexity – more and more immediately now affecting the daily lives of many – is a very significant current source of current health risks. We would expect that many of these would be modulated at the job, company, industry, and country level, and we do directly, if only in an aggregate manner, test this in JCQ2 Paper 4 (added variance findings). In addition, in our opinion, these now directly increase demands for "ordering capacity, see Figure 4," whose burdens can add significantly to work task and work/family stressor loads.

One Paper 4 findings illustrates that the ameliorative "positive" associations of Control with wellbeing (negative associations with illness measures) declines with the larger levels of external demands. That is: if we go stepwise with increasing external-to-work demands: beginning by (a) comparing job-seeking social relations burdens, to (b) the additional load of job personal and career job insecurity, and then (c) to the still further to the added loads of work/family conflict, by the third step the associations with dependent variables are overwhelming related to demands levels, and not control levels, which have relatively stronger associations at the lower demand levels. The implication is that individual-based control, or even perception of it, is not sufficient to address the

increasingly large burdens of our market-integrated global economy. Further, social-level forms of control would be needed to moderate these demands.

So, we can understand why the innovation thus required for economic growth in advanced economies - innovative production - must have a basis in workplace and labor economic stability. This would imply that the socio-economic "deregulation" advocated by unrestricted free-market economic policy, bringing with it work insecurity would certainly not be healthy, or growth supporting. We could understand why rigidly neo-liberal policies of " removing the safety nets" to motivate workers are not likely to succeed.

Figure 4



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APPENDIX: Ecological Fallacies

APPENDIX:. An Issue: multiple "System's Models:" one for Stress/Health another for Work Structure (and creativity)

Obviously we must **avoid ecological fallacies** - on a major scale here. We are in fact discussing – for our **work organization and job stress research, two totally independent, complex system "universes;"** one at the physiological level (itself multi-level), and one at the modern company/organization level (with several level here). There is no reason to assume all levels would follow the same principles: that would be the "ecological fallacy (and indeed we can list several examples of quite incompatible explanatory structures among our own discussions)[22]. However, it is nevertheless notable that, since the "open-systems" theoretical approach has enjoyed major success in both of these universes, a very general revision of this approach (such as this one) could at the very least be **useful for "hypothesis-generating' starting point** in both "universes."

But we would have to test to see if this is indeed true. In this article our discussion uses somewhat different language/ linkages at the organizational level[23] and physiological level[24], but of course the actual science is of course dramatically different in each case. Obviously, evidence is required at all levels[25].

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[22] Examples of Cross-level explanatory incompatibilities within the A-D/C Model area:

a. Conducive Production is based on a newly discussed aspect of human motivation: the worker has "skill's which have a need to used." This is one of the cross-platform examples of need to be careful for ecological fallacies. This requirement above of course could only be relevant for sentient human beings, not system models with non-human membership.

b. vs. high level (i.e managerial behavior) systems explanation of organizational effectiveness (which is well accepted), vs. a high-level systems explanation of disease (ADD: insert: Karask's P-OTD, 2012) which would be considered "speculative.").

c. Job stress, worker participation vs. Taylorism and the dynamically-growth of automobile assembly line in the 1920's and 1930's. (ADD: further explanation)

d. Physiology: At the molecular level, chemists can be satisfied with describing how chemical equilibriums occur "automatically" (albeit, at variable rates). However, maintaining equilibrium for human-scale stable action in a complex and variable physical and social environment represents full-time planning, however much routine "autonomicity" it might suggest to some very high-level observer. For example: Guyton's viewpoint in his "Introduction" to his classic textbook *Medical Physiology* (18), that all human physiological processes represent a total "autonomicity."

[23] Evidence: At Organization-level for High-level causation

Athe organization level - precisely because of this generality of these systems approach and our hypotheses, we can also present of high-level "causality: from an central mangement organization-level decision mechanisms: explanations that can easily be broadly accepted as valid. For example, it would seem to be a very reasonable conclusion, in light of recent years' business news, that organizations could "fail" only because of decisions failure at the management level (i.e., high-level mistakes) - even when the overall (low-level) functions of company operation are otherwise completely "healthy." Also, on the "positive-side" at the organization-level: "solutions" could only mainly be effective when prioritizing high-level environment actions for companies (i.e., new capital, market changes, etc.), since, for example, workers may already be working a close to maximum capacity.

[24] Evidence at the Physiological Level for this new three-level system perspective - and a major implication; "high-level" causality of disease. What is the status of evidence for this new system-level version? We do have evidence: workplace field study heart/health empirical confirmation testing workplace exhaustion and loss of regulatory capacity (Collins et al, 2005) (Slide **#29**), and discussion of multi-level physiological levels of order capacity creation show several lower levels which are incontrovertibly consistent (Karasek, 2008, Table1). (ADD: Discussion of P-OTD, 2012) "But the theory's predictions are so broadly general, that the above explanations are primarily still speculative at many levels of prediction.

[25] We must clearly acknowledge, that at both the physiological and organizational process levels, the next step in confirmation of such very generalized new D/C theory involves more specifically constructed testing. We need to do this research (Karasek, et al, 2010).

APPENDIX: Dollard and Karasek, 2010

Dollard, M, Karasek, R, "Building Psychosocial Safety Climate: Evaluation of a Socially Coordinated PAR Risk Management Stress Prevention Study," in Houdmont, J. & Leka, S. (Eds.) Contemporary Occupational Health Psychology, Wiley, (2010).

"How to Build Psychosocial Safety Climate: Multilevel Socially Coordinated Response:"

Instead, Dollard and Bakker (in press) note that two separate research and practice literatures have emerged; safety climate literature, focusing on workplace climate, work systems, the environment and physical health; and work-related stress literature focusing on psychosocial risk factors and psychological health. Therefore PSC, because of its links to both areas, potentially unifies disparate lines of research.

The relationship between PSC and the team psychological safety construct (Edmondson, 1999) has been discussed elsewhere (Dollard & Bakker, in press). Theoretically, we see psychosocial safety climate as *causally prior* to psychosocial working conditions, such as organizational support and worker control, rather than as an outcome of them, as suggested in the psychological safety literature (cf. Kahn, 1999). The specific antecedents to psychological safety are not coherently theorized in psychological safety theory. In the literature, psychological safety in teams is an optional benefit to enhancing team and organizational performance (Edmonson, 1999). By contrast, psychosocial safety climate, like safety climate, may well be mandated legally, under duty of care provisions (See & Jhinku, 2002).

By defining a new psychosocial safety climate construct, we build on the foundational work of psychological safety and the safety climate literature, and hone in on the features of climate specifically expected to affect psychological health. We argue that psychosocial safety climate flows principally from the priority given by senior management to the balance of production imperatives versus concern given to the psychological health of the workers (Dollard & Bakker, in press).

According to Zohar and Luria (2005), even though organizations have formal policies, practices, and procedures, the best indicators of an organization's true priorities are the enacted counterparts. In the case study presented here, we examine how changes to policies, practices, and procedures implemented in work groups within schools as part of an organizational intervention affect work-related stress. We expect that perceptions of these activities at a group level and the perceptions of the process and progress of the implementation may be good indicators of an emerging psychosocial safety climate at the group or team level. This is the focus of the intervention evaluation. To provide the context, next we describe how PSC may be built at the organizational level.

How to Build PSC—A Multilevel Socially Coordinated Response

Recent research has emphasized a hierarchy of causes in relation to occupational health (Sauter et al., 2002). Efforts to build PSC within organizations could feasibly come from sources external to the organization, from the organizational level, or the team level. Theoretical and empirical research in the work-related stress literature has mainly focused on individual or job task domain causes of work-related stress (Kang, Staniford, Dollard, & Kompier, 2008). Accordingly, interventions are also pitched at these levels. However according to the logic of a hierarchy of causes, the "causes of the causes" (Marmot, 2008), the greatest impact should arise from targeting more distal causes. Therefore, building an intervention at an organizational level seems a promising option. An intervention at an organizational level may include monitoring and modifying working conditions and funneling resources where needed, filtering or gate-keeping overwhelming and unpredictable demands, and in turn building conditions that are conducive to healthy production.

In his treatise regarding the "associationist" Demand–Control model, Karasek (2008) argues that contemporary forms of economic and social organization may be associated with evidence of the increasing prevalence of chronic disease problems that may potentially be stress-related such as cardiovascular disease, mental disorders, and musculoskeletal problems. The reason given is that, very possibly, the work- and economic-system burdens may potentiate low control in social organizations (Karasek, 2008). Intervention is therefore required to coordinate or implement control at a higher level, so that it can have effects at a lower level.

Most of the traditional models of work-related stress posit a load-response pathway to describe the development of stress related illness. However the idea behind the "associationist" Demand–Control model is that the impact of the burden results from the lack of control an individual has over the complex physiological coordination required in response to increasing demands. According to Karasek (2008), physiological coordination has been pushed to extremes because of long-term exposure to stressors in the current global economy. The social policy implication is that diminished capacity for physiological coordination finally leads to chronic disease. The stress-disequilibrium component of the "associationist" demand–control perspective as applied here describes how development of higher levels of internal organizational order allows the organism to effectively deal with environmental demands—without damaging the "health" and stability of the lower level systems. Employees, work groups, and so on, can maintain their health in the face of strong external demands, e.g., competitive global markets or demanding parents within schools.

Using the same principles, we argue that at a higher level within the organization, a lack of coordination and resourcing of incoming demands could in turn lead to threats to individual workers' stable self-regulation—interfering with coordination of tasks, personal development, job stability, and work/family life at the individual level. Our proposed alternative is that a social collective structure at the organizational level ought to be created to control and coordinate incoming demands to help to build external social control, and theoretically to facilitate worker control and internal capacity for self-regulation without the worker being overwhelmed.

Perhaps more so than ever before, the platforms of stability outside an organization are being eroded or undermined by global economic phenomena (e.g., breakdown of the family) (Karasek, 2008). Therefore, it is argued that internal organizational level regulatory structures are required. Such systems have the potential to produce order in the environment, through the coordination of responses to demands, and thus decrease entropy in the environment (ibid.).

Karasek (2008) views the individual in the organization and in the environment as an energy based system, a series of flows. The theory draws on the second law of thermodynamics which asserts that all order in complex structures runs

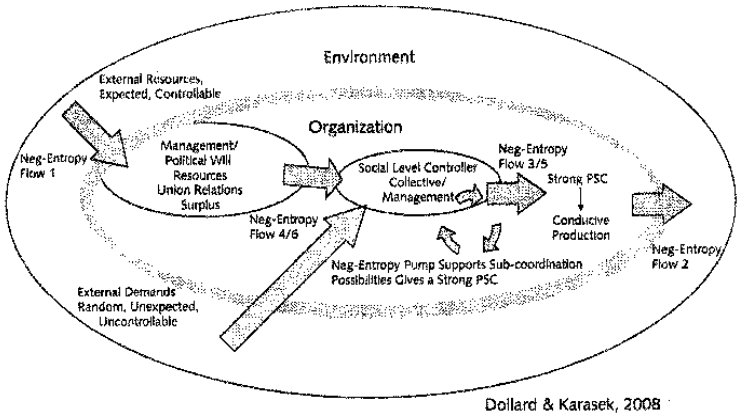

Figure 11.1 Healthy Conducive Production Model

downhill, so called increasing entropy. "Thermodynamic work is ordered energy with few degrees of freedom" (p. 121). To perform work an individual needs to convert disorganized energy into "structured responses." According to Karasek, "at work there are constant flows of energy or inputs that are constantly transformed into ordered action (work)" (ibid). Work is defined as "the purposeful and precise organization of the actions of the organism to meet unpredictable demands for action from the environment (external work)" (ibid).

In this chapter we argue that the effect of demands at the task level would be reduced if a social level controller was introduced into the system – with the goal of supporting a positive psychosocial safety climate (see Figure 11.1.). The idea is that foundational resources may become available from the external and internal environment, stemming, for example, from management political will, employee good will, financial surpluses, union support, trust, and other resources. These inputs need to be transformed from their uncoordinated form, through work, to outputs in terms of effective organizational performance, and especially in terms of the "state" of employees internal work environments. This could be achieved through a committee that is, for example, responsible for constraining the degrees of freedom of the disorganized energy, by designing specific sets of well-coordinated policies across levels and between departments, as well as practices and procedures to protect the psychological well-being of workers. These policies could relate to workload, profits, health programs, and return to work. In turn, these policies and ensuing procedures and practices reduce the chaos of disorganized and overwhelming demands (see bottom arrow, Figure 11.1), and actually create a reasonable number of feasible, alternative (and now well-supported) approaches. Participative democratic discussion at this point can ensure that the final multilevel solutions integrate worker contributions—and are consistent with moral goals for democratic engagement.

We see social coordination as an opportunity structure for social dialogue between competing interest groups (e.g., employers and employee representatives), and for providing political empowerment and voice particularly for those with the least power in organizations (e.g., those working at the coal face). Leka and Cox (2008) argue the urgent need for stronger social dialogue structures given the global market pressures for organizations to meet competing demands by adopting short-term economic goals, rather than longer-term sustainable work systems, that balance competitiveness with quality of work life. Social dialogue in this context is necessary for the development, implementation, and sustainability of stress prevention initiatives (developed in the social structure).

In accordance with Karasek's theory, the social structure acts as a negative entropy (NegEntropy) pump acting to create ordering capacity from random energy or "cheap" available disordered energy in the environment. As shown in Figure 11.1., when a higher social level controller is developed it can support a NegEntropy flow, which allows new action alternatives at the higher level, which in turn can be supportive of lower-level contribution. This implies that a new high-level structure is created which can support "stable function"—safe work environments—at sublevels. Subcoordination of demands at an individual level is possible because strong PSC is built through social coordination. Workers are freer to utilize their decision making authority which can then potentially directly affect psychological health or moderate the impact of demands (Karasek & Theorell, 1990). In turn, the efforts of the committee and the workers produce a NegEntropy flow to the environment, e.g., a new product or improved teaching, within the context of sustained well-being.

The notion that job demands can overtax or exhaust one's energy supplies is also discussed in other work-related stress theories, such as Job Demands–Resource (JD–R) theory. In JD–R theory the health impairment/erosion process is hypothesized when high or unfavourable job demands drain employees' energy resources and may lead to burnout *and in turn* to health problems (Schaufeli & Bakker, 2004). We argue that healthy conducive work means that performance must be maintained at humanely sustainable levels. Given the seemingly inevitable negative consequences of unremitting high demands, consideration must be given to the social regulation of demands, and the facilitation of control at higher levels in the organization.

Case Study

The aim of this case study is to describe the establishment of social structures that enabled the facilitation, development, and implementation of a participatory action research–risk management (PAR–RM) intervention to reduce stress. The intervention was based on a number of best practice principles identified as underlying successful work-related stress interventions and psychosocial risk management including: (1) a stepwise method; (2) the participation of workers; (3) risk assessment and task analysis; (4) context-specific interventions based on an accurate assessment of both individual and organizational factors rather than relying on