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## *The Economic Cultures of Fear and Love*

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### **ABSTRACT**

*In earlier work, the author has studied the economic case for complementarity as the dominant feature of social interdependence. This paper examines the different choice strategies implied by substitution and conflicts of interest vs. economic complementarity and concerts of interest, in light of the psychological literature on negative vs. positive emotions and their health effects, along with neurological research showing how we humans are hard-wired for empathy. The aim of the paper is to extend the horizontal case for complementarity into its psychological links to research on cognitive function and its emotional basis. Substitution and complementarity yield different conclusions about optimal institutional forms and how we address social relations. Recent psychological and neurological studies support the case for complementarity in economic relations, showing that substitution and competition should be rejected for cooperation as a means to social improvement in a healthy society.*

## *The Economic Cultures of Fear and Love*

### **I. Introduction**

In previous work, the author explored the importance of complementarity in economics with regard to its roots in increasing returns and its implications for institutional structure and social organization (Jennings 2008a, 2009ab, 2010ab). Traditionally, economists emphasize substitution as the dominant form of economic connection, on which the entire efficiency case for competition is founded. Complementary interdependence shows a case for cooperation as our route to efficiency, in which competition reduces output just like collusion with substitution (Jennings 2005, 2006a, 2008a). Introducing a new phenomenon of 'horizon effects' suggests that competition is also resulting in a myopic culture, repressing output of intangible goods such as information, love and learning (Jennings 2008bcd, 2009e, 2010a), and yielding costly ethical and ecological losses as well (Jennings 2003, 2006b, 2009c, 2010b). This paper addresses the psychological health implications of competition and cooperation, and the social welfare effects of their resulting cultural patterns.

Economics is (and should be) about human well-being and how to organize social relations so that well-being can be achieved through an efficient use of resources. But human well-being is psychological, raising questions on why so many economists seem to avoid this subject, treating competition as ideal while ignoring its human impact.

The nature of interdependence, seen as a balance of substitution (negative feedback) and complementarity (positive feedback), captures a cultural nexus of fear and love in human relations.

What is the basic characteristic of human economic connection? Does it truly embody opposition and conflicts of interest, as substitution assumptions imply? If so, then competition will operate to resolve these conflicts. But what if our wants and needs are really aligned in a concert of interests, so they are complementary in their relation? Then it is cooperation – not competition – that is efficient. The economics of planning horizons strengthens the case for complementarity and cooperation due to interhorizontal complementarity: horizon effects spread contagiously across social space, showing concerts of interest in learning, ethics, social stability and human health. There is an even stronger case when neurophysiological and psychological issues are raised; they also reinforce the horizontal arguments for a more amenable system based on cooperation. This paper reports on some of the new research in these fields and describes its significance for economics.

## *II. Two Forms of Interdependence*

One of the least supportable axioms of traditional economics is an independence assumption that justifies the use of partial analysis in economics, ‘as if’ phenomena under study were separate from thus ‘irrelevant’ options. In recent years, a more robust economics of networks has emerged, taking note of unbounded interconnectedness in economic concerns, save for the fact that most studies examine nonholistic contexts. Another more radical view is that of ecological economics, where all choices are seen as entwined and imbedded in ecological settings, and are thus subject to vital limits on natural resources and their use. As Georgescu-Roegen (1970, pp. 2-3) said, “actuality is a seamless whole” which “has no joints to guide a carver.” The nature of social interdependence as substitution or complementarity is a matter that must be addressed directly and not ignored.

The question is how, in the most general case, our wants and needs are related: is the interpersonal correlation of human desires positive or negative? Traditionally, economists have assumed that tradeoffs dominate throughout the realms of economic production and demand – as well as in social relations – although a case can be made for synergetic complementarities in all these settings (Nelson 1981, Jennings 2008a, 2009b, 2010a). A network concept embraces substitution and complementarity in an interdependent balance; systems theory uses the notion of feedback to do the same (Senge 1990, pp. 79-80). In transportation networks, the notion of parallel links and end-to-end ties are equivalent to these concepts (Jennings 2006a); here the distinction is contextual and purpose-specific, since any one traveler’s tradeoffs are another’s serial routes. The point is that our relations of interdependence coexist in a nondecomposable mix: we either drink beer or wine when we’re thirsty, often with pretzels or cheese, but throwing a party includes them all against other options (such as a film or bowling). In a complex economy, substitution and complementarity are interwoven and not distinct; we need to address them as a balance of interactive phenomena.

But this raises a fairly intractable institutional question: if substitution points to competition as efficient, and complementarity calls for cooperation, how do we organize social action for maximum benefit and well-being? Can we weigh these relations of interdependence in different contexts and design our institutions accordingly? And if competition encourages substitutes while stifling complements, while cooperation does the reverse, should we look for ‘seams’ in this ‘seamless whole’ across which one or the other applies and structure society thus? Or are these interdependent distinctions far too context- and purpose-specific even for that to work? Unless we can declare that one or the other is a general case – if so, I would opt for complementarity (Jennings 2008a, 2010a) – we need to take a different tack with regard to resolving the question. This is where planning horizons come in...

If we assume a balance of substitution and complementarity in every economic context, then the question to ask is how ‘horizon effects’ shift that balance, which has a very general answer. Given interhorizontal complementarity – namely, that private ‘horizon effects’ are socially contagious – the balance of substitution and complementarity, with horizontal lengthening, gravitates away from substitution in favor of greater complementarity in economic relations. As planning horizons extend, incentives align and social conflict declines since people take into broader account more of each others’ needs in their choices. Another way to say it is this: longer social horizons bring more internalization of externalities spilling from private decisions since they equate to an ethical increase of conscience in their radiant impact (Jennings 2009d, 2010b). In the course of economic development, the composition of wants

shifts away from material goods to intangible outputs, showing another reason for the transition from substitution to complementarity as we grow and mature. Horizon effects structure relations in all economic contexts.

This story yields a bottom line: competition is spawning a myopic culture due to its stifling of intangible goods such as learning, culture, love and information, while also encouraging catastrophic ethical and ecological losses. The lesson of economic development is that social institutions need to adapt to this shift of economic relations toward complementarity by adjusting from competitive to more cooperative frames (Jennings 2009f). All these arguments state a context to what follows below. What will now be addressed are the cultural and psychological impacts of these two views of interdependence. Substitution assumes opposition of interpersonal interests, so all of us compete with each other as a means to their resolution, placing goods into the hands of those who want them most (where ‘want’ is gauged by an agent’s willingness to pay, ignoring income effects). Complementarity, on the other hand, takes our wants as aligned, where our fortunes adjust together like a tide raising and dropping all boats. The human and cultural implications of these two orientations could hardly be further apart.

### III. Two Economic Cultures

A very simplistic classification of the economic cultures stemming from substitution (opposition) vs. from complementarity (common needs) is based – as shown in this paper’s title – on the notions of ‘fear’ vs. ‘love,’ for reasons to be explained. Another standard of comparison, of particular interest to social economists, is on the relative individualism of economic cultures. In an essay on human ‘flourishing’, Peterson and Chang (2003, p. 69) compare Western and Eastern cultures with respect to their social linkages thus:

*Cultures clearly differ in their emphasis on individual agency, and again the contemporary United States would seem to fall far out on this continuum. In the United States, the most important goals we have as a people include individual choices, individual rights, and individual fulfillment. Americans are greatly occupied with what they can and cannot accomplish ... and ... with what they can acquire. These expectations tend to be decontextualized, unqualified by a consideration of the social, economic, and historical factors that can shape outcomes. ...*

*... So Western cultures have been described as being individualistic. In such cultures, individuals are expected to seek independence from others by attending to the self. As a result, individuals from such cultures grow to develop a sense of the self largely independent of others. In cultures where the independent self is predominant, we find a self-enhancing bias involving overly positive views of the self, illusions of control, and unrealistic optimism.*

*In contrast, the focus in Eastern cultures traditionally has been on a view of the individual who maintains a fundamental relatedness with others. Attending to others, harmonious interdependence with them, and fitting in not only are valued but are often expected, which results in an interdependent view of the self.*

So one comparative frame for economic cultures based on substitution and complementarity would be on their degree of individualism and therewith their inclusion of others in their decisions or reflections thereon. The self-orientation of agents in the United States is to be contrasted with the attempt in more Eastern cultures to achieve “harmonious interdependence” with their social community. Yet there is a problem here, if systems adapted to human selfishness serve to reinforce such behavior! Senge (1990, p. 274, quoting Badaracco and Ellsworth 1989) notes the “self-fulfilling” character of the belief “that people are motivated by self-interest and by ... power and wealth”:

*If people are assumed to be motivated only by self-interest, then an organization automatically develops a highly political style, with the result that people must continually look out for their self-interest in order to survive. An alternative assumption is that, over and above self-interest, people truly want to be part of something larger than themselves. ... When organizations foster shared visions, they draw forth this broader commitment and concern.*

Furthermore, if our rampant selfishness is symptomatic of short horizons in a myopic culture, as implied above, then accepting this sort of behavior as ‘natural’ is a part of the problem. Some management theorists suggest this is so. Argyris (1971, pp. 262-63, 268-69; also cf. Maslow 1954, 1968; Wachtel 1989; Kohn 1986; Scitovsky 1976; McGregor 1971), an organizational expert, declared that when conventional management treats organizational members like children rather than as adults, mature individuals in these settings show symptoms of ill health, including “frustration, failure, short time perspective and conflict.” He voiced concern about organizational fragmentation thus: “The nature of the formal principles of organization causes the subordinates,

at any given level, to experience competition, rivalry, intersubordinate hostility and to develop a focus toward the parts rather than the whole.” McGregor (1971, pp. 310-11) warned in a well-known management paper that:

*The deprivation of needs has behavioral consequences. ... The man whose needs for safety, association, independence or status are thwarted is sick, just as surely as he who has rickets. We will be mistaken if we attribute ... passivity, or ... hostility, or ... refusal to accept responsibility to ... inherent ‘human nature.’ These forms of behavior are symptoms of illness – of deprivation of ... social and egoistic needs.*

McGregor went on to explore the connection to rampant consumerism and materialism in modern cultures:

*...the fact that management has provided for these physiological and safety needs has shifted the motivational emphasis to the social and egoistic needs. Unless there are opportunities at work to satisfy these higher-level needs, people will be deprived; and their behavior will reflect this deprivation. ... People will make insistent demands for more money under these conditions. It becomes more important than ever to buy the material goods and services which can provide limited satisfaction of the thwarted needs. Although money has only limited value in satisfying many higher-level needs, it can become the focus of interest if it is the only means available.*

The point of all this is simply to intimate that some manifestations of selfishness and short-sightedness in our culture may be pathological symptoms of our own improper designs, so of a competitive failure in the presence of complementarity. This is the role and importance of horizon effects in economics. Without a theory of planning horizons, horizon effects stay unseen.

The difference in economic cultures seen in this paper is also horizontal. This is implied in the quotes above and accentuated in what is to follow. In accord with this view, a focus on competition and cooperation in their cultural manifestations should help to frame these connections, after a few introductory comments about the use of ‘fear’ and ‘love’ as a way to distinguish between these systems in terms of their psychological impact.

First, it is not always the case that fear rules in competition, any more than love will always be the hallmark of cooperation. Every case is different, and people deal with their environments and cultures in diverse ways. So one must understand that this simplistic categorization of ‘fear’ and ‘love’ as the basis for comparing cultures is just that: it serves as an easy way to capture their basic difference. However, having offered that disclaimer, the social implication of substitution and competition is that others are generally seen through a lens of opposition, thus in terms of a conflict of interest. In this sense, competition entails a rivalry of individual agents, such that everyone needs to guard their position against the incursion of enemies. Kohn (1986, pp. 55, 61-65, 108, 110, 113, 123, 129-31 and 143) described the psychological impact of competition on human performance thus:

*The simplest way to understand why competition generally does not promote excellence is to realize that trying to do well and trying to beat others are two different things. ... Competition ... precludes the more efficient use of resources that cooperation allows. ... Beyond the greater efficiency of cooperation, it is also true that competition’s unpleasantness diminishes performance. ... At best, the stressfulness of a competitive situation causes us to try to avoid failure. And trying to avoid failure is not at all the same thing as trying to succeed. ... Competition does not promote excellence. ... Whereas cooperation apparently contributes to high self-esteem, competition often seems to have the opposite effect. ... Psychological health requires unconditionality... In competition, by contrast, self-esteem is conditional. ...Something very like an addiction is at work here...: the more we compete, the more we need to compete. ... In sum, the security that is so vital to healthy human development is precisely what competition inhibits. ... Competition does not promote ... substantial and authentic ... individualism. On the contrary, it encourages rank conformity [and] ... dampens creativity. ... Creativity is anticonformist at its core; it is ... a process of idiosyncratic thinking and risk-taking. Competition inhibits this process ... [and] affects the personality. Turning life into a series of contests turns us into cautious, obedient people. ... The chief result of competition ... is strife.*

So this is one view of how an individualistic culture of fear, stress and strife fares for individuals. We look to our rivals as opponents, each against the other. We believe it is in our collective interests to compete with each other, as so many economists have forcefully argued for this view. Yet there remain doubts, some of which Kohn expresses so well. Indeed, as Argyris pointed out, the psychological impact of treating adults like children include “short time perspective and conflict.” This sort of manifestation is symptomatic of social horizon effects

within a myopic culture. These are behaviors we all have grown used to; as McGregor (1971, p. 317) said so aptly: “Fish discover water last.” But let us now look at the contrast with the assumption of complementarity.

When one assumes that others’ interests are in line with one’s own, the social scene changes in radical ways. First, if I believe your well-being contributes to my own, then I will make as much effort to help you as I do for myself; indeed, the whole premise starts to erase a distinction between my own needs and yours! Indeed, this is what Nelson (1981, pp. 1053-55) said, when translated to human relations: “If factors are complements, growth is superadditive... The growth of one input augments the marginal contribution of others.” In this setting, individualism does not apply: “there are not neatly separable sources of growth, but rather a package of elements all of which need to be there.” In other words, cooperation is sought to actuate complementarities and to allow human flourishing. There is scant distinction to be made between one person and another in terms of their needs. All rise and fall together; the more effectively we work as a team, the better off we all are.

But, second, the limit to bountiful collaboration is precisely the sort of behavior rewarded by competition! Selfish predation and opportunism make cooperation impossible; everyone needs to be on the team, to work in full concert together, or this form of social organization fails to perform at its true potential. Alas, it is rare to find success in this setting; we are so habituated to individualistic action that the fruits of cooperation tend to stay out of reach. This is the real tragedy of a competitive culture and what it teaches; selfishness, far from being a virtue, precludes successful organization of complementary efforts. We never see what we miss.

So what we have are two economic cultures, simplistically characterized as those of ‘fear’ and ‘love.’ One is rife with opposition and conflicts of interest as its guiding light; it leads to a culture of fear reflected in stress and strife across society. The other is open through common needs to realize a concert of interests, if team members are able to set aside their personal inclinations sufficiently to work for the welfare of all, to let down their resistance and see each other with care and compassion. We are all prisoners of this dilemma; arguably, it is the source of much of our social malaise (Jennings 1983). The new research in neuropsychology also attests to such things; these are issues economists should be aware of: they are a very large part of the reason for writing this paper.

#### **IV. Human Well-Being and Functionality**

Economics is about decision-making. But the making of decisions – rational or not – is about the successful projection of actual outcomes through some causal understanding by a selective and uncertain mind. The process involves speculation: ‘If I kick the world in this way instead of in that way, this will be the result and not that.’ But what are the goals and intent of our actions? In the most general sense they are to reduce negative and to promote and achieve positive feelings in oneself (hopefully inclusive of others but not necessarily so). We act and choose for ‘well-being’ but do not always achieve it. There are many slips between cup and lip.

For one thing, we live in a social world where reactions by others should be a critical part of understanding what we do and results thereof. As Norris and Cacioppo (2007, p. 87) point out:

*...human beings are fundamentally social creatures. And ... emotions may have evolved to promote cooperation and communication in a social group... Social information is highly valued and critical for survival throughout the lifespan, as it contributes to successful attachment, reproduction, vigilance toward threatening encounters, and protection of territory and significant others. From birth, we engage in behaviors intended to ensure affiliation with other members of the species, especially caregivers.*

Whenever we make a choice, we perceive its situational context, apply a causal model thereto as part of the process of understanding its structure and operation, project the potential outcomes of diverse courses of action, and then evaluate those options and make a decision based on one of those outcome’s likelihood and value. The value-assessment has an emotional component – it may be its central feature – seen as positive (for affinity) or negative (for retreat) that informs our best course of action.

##### **a. The Roots of Human Empathic Connection**

But how do we know what others will do, reacting to our decisions, and how do we know what they might think or be doing autonomously on their own? All will affect the results of our choices, so we must develop prior expectations of others’ vantages and general intentions. This calls for an empathetic comprehension of

others that does not happen automatically; empathy should be included in economists' understanding of choice. Choice is a normative process of multidimensional causal projection that includes others on its screen. Indeed, as Norris and Cacioppo (2007, p. 93) observe, "it can be dangerous not to read correctly the motives and intentions of others. ... Accurate evaluation of the motives of others and decryption of their current emotional states are skills necessary for navigating our social world."

Fortunately, recent findings in neuroscience shed light on the question of how we develop empathic capacity; mirror neurons suggest "a common neurobiologic dynamic for our understanding of others" in which "we mentally rehearse or imitate every action we observe ... mirror neurons help us share others' experience as reflected in their expressions, providing a biological basis for empathy and for the well-known contagiousness of yawns, laughter, and good or bad moods" (Dobbs 2006, pp. 1-2). "This model posits that perception of emotion activates in the observer the neural mechanisms that are responsible for the generation of similar emotion. Such a system prompts the observer to resonate with the emotional state of another individual..." (Decety 2007, p. 252). As Gallese (2004, pp. 4-5) put it:

*Successful perception requires the capacity of predicting upcoming sensory events. Similarly, successful action requires the capacity of predicting the expected consequences of action. As suggested by an impressive and coherent amount of neuroscientific data, both types of predictions seem to depend on the results of unconscious and automatically driven neural states, functionally describable as simulation processes. ... Such body-related experiential knowledge enables us to directly understand some of the actions performed by others, and to decode the emotions and sensations they experience. Our seemingly effortless capacity to conceive of the acting bodies inhabiting our social world as goal-oriented persons like us depends on the constitution of a "we-centric" shared meaningful interpersonal space. ... Intentional attunement, ... by collapsing the others' intentions into the observer's ones, produces the peculiar quality of familiarity we entertain with other individuals. This is what "being empathic" is about. By means of a shared neural state ... the "objectual other" becomes "another self."*

However, the process is neither direct, automatic or simple. Mirror neurons, according to Iacoboni (2007, p. 447), "do not simply provide an action-recognition mechanism but rather represent a neural system for coding the intentions of other people" that "seems to reflect a more holistic stance toward contexts, actions and intentions." As Norris and Cacioppo (2007, p. 96) explain:

*One example of the effects of social context on emotion is that of empathy, in which the emotional meaning of an event is completely dependent on the social context in which the experienced emotion mirrors that of a conspecific. By definition, empathy cannot occur in the absence of a social context. Recent research on the neural mechanisms underlying empathy suggests that empathic responses are accompanied by, if not generated through, imitation of facial expressions. ... A recent study suggests that empathy does not rely merely on mirror neurons and activation of motor networks or imitation of emotional expression but may have also co-opted other neural structures involved in emotional processing. ... Thus the experience of empathic pain for a loved one may have co-opted the existing pain network... Empathy, however, is not always the adaptive response to a conspecific's emotion display; motives, intentions, and context must be taken into consideration to generate an appropriate response. ... Thankfully, we are not dependent on blind faith attributions of the motivations that drive fellow human beings; rather, we are able to reason and make inferences about others' mental states. Such inferences constitute additional contextual (and social) influences on emotional experience.*

#### *b. The Relation of Social Connection to Physiological and Mental Health*

But these social connections are also related to physiological as well as mental health and well-being. As Carter (2007, pp. 425, 434) notes:

*...the major challenge for science in the 21<sup>st</sup> century is developing an understanding of the processes and mechanisms responsible for health. It is increasingly clear that health is not simply the absence of illness but that it includes active processes, maintained in part by social interactions and social bonds. ... The benefits of social support and social bonds have been described in epidemiological studies. Perceived social support is often negatively correlated with various illnesses, ranging from mental illness to heart disease and cancer. ...*

*Of special relevance to human health is the capacity of a perceived sense of social support or the presence of social bonds to reduce fear and overreactivity in the face of stress. Reductions in social behavior and stress*

*management are features of many forms of mental illness, including autism, depression, and schizophrenia. Episodes of certain mental illness ... may be induced or at least exacerbated by social stressors, especially in the absence of social bonds.*

Taylor and Gonzaga (2007, pp. 466-67) find it “intriguing” that “the affiliative system ... continues to have such powerful effects on health and survival into the present day ... through social support and social integration...” They then explain what has been learned on this important topic:

*Research consistently shows that social support reduces psychological distress, such as depression or anxiety, and promotes psychological adjustment to a broad array of stressful conditions. ... In both animal and human studies, social isolation is tied to a significantly enhanced risk of mortality and a heightened risk of both chronic and acute health disorders. Although not all the mechanisms that explain these strong relationships are known, one key pathway is via stress responses. ... People without social support systems, for example, are more vulnerable to infectious disorders. Correspondingly, the positive impact of social ties on health outcomes is as powerful as or more powerful than established (negative) risk factors for diseases, including lipid levels and smoking.*

Norris and Cacioppo (2007, p. 88) also underline the role of social linkages in human health and functionality, where social relationships have important beneficial effects in contrast to the risks of individual loneliness:

*Healthy social relationships continue to be important for emotional and physical well-being throughout the lifespan, as evidenced by research demonstrating that social isolation is a major risk factor for morbidity and mortality and that loneliness, an emotional response to broken or inadequate social connections, is related to cardiovascular function and sleep quality. ... Lonely individuals report ... higher negative affect and lower positive affect... ... Loneliness has a pervasive influence on everyday affective experience and quality of social interactions and, importantly, that these two outcome factors have reciprocal effects on each other. In other words, both the chronic perception of one's social belongingness (i.e., loneliness – social connectedness) and fluctuations in the quality of social interactions appear to have effects on one's daily emotional life. In addition, loneliness relates to cardiovascular functioning and stress appraisals, such that lonely individuals exhibit greater total peripheral resistance (TPR) and lower cardiac output (CO) than their socially embedded counterparts. Thus daily social interactions have consequences not only for emotional experience but also for cardiovascular functioning and health.*

As Cacioppo, Petty and Tassinari (1989, p. 83) note: “...The leading causes of disability and death in Western civilizations have substantial social and behavioral components...” Uchino et al. (2007, pp. 474-75) elaborate on the medical aspects of social connectedness:

*Social processes are among the more powerful psychological predictors of physical health outcomes. As predictors or mechanisms, social events appear to play important roles in both the development and exacerbation of physical health conditions. For instance, social support, besides being a consistent epidemiological predictor of mortality in itself, is purported to be an important pathway in other risk factors, such as socioeconomic status and personality processes. ... It is our view that a social neuroscience perspective is critical to understanding the links between social ties and health outcomes.*

After reviewing the harmful cardiovascular effects of social stress and some of the more general aspects of biological function in its dependence on healthy social relationships, Uchino et al. (2007, p. 480) discuss...

*...the large body of epidemiological studies suggesting that both the quantity and quality of one's relationships predicts lower all-cause mortality. The links between social relationships and health are most evident for cardiovascular mortality, with some studies showing links with lower cancer and HIV mortality.*

### c. *The Impact of a Stressful Society on Human Health*

Much research has been addressed to the particular health effects of stress; Kudielka et al. (2007, pp. 56-57) explain the degree of importance assigned to this concern: “The World Health Organization (WHO) concluded that stress is one of the most significant health problems in the 21<sup>st</sup> century. ... Stress responses appear to be a close correlate or even a determining factor of the onset of different diseases or disease progression...” Taylor and Gonzaga (2007, pp. 456-57) add that, in contrast to its long-term effects which can be extremely harmful to health, stress has short-term survival benefits in ‘fight or flight’ situations ...

*...because [these responses] mobilize the body to meet the demands of pressing situations and then prime homeostatic mechanisms that restore the body to its previous functioning. With repeated or recurrent stress, however, biological stress responses can have long-term costs that have implications for health... [including] suppression of cellular immune function ... chronic increases in blood pressure ... abnormal heart rhythms ... immunosuppressive effects ... increased susceptibility to infectious disorders ... hypertension, cardiovascular disease, and insulin resistance, enhancing risk for diabetes, among other disorders.*

They raise some questions about these responses to stress, since “fighting or fleeing may not be humans’ best defense against predators.” Instead, they offer another strategy that they term “‘tend’ and ‘befriend’”: “Coming together as a group, instead of fleeing and fighting on one’s own, would provide more hands for defense and perhaps confuse or intimidate a predator. ... In short, there are good reasons to think humans have evolved to use social relationships as a primary resource to deal with stressful circumstances.” Indeed, as they put it:

*From animal studies and our own data, we infer that there is an affiliative neurocircuitry that prompts affiliation, especially in response to stress, in many animal species, and especially in humans. ... That is, just as people have basic needs, such as hunger, thirst, sexual drives, and other appetites, they also need to maintain an adequate level of protective and rewarding social relationships.*

*Just as occurs for these other appetites, we suggest that there is a biological signaling system that comes into play if one’s affiliations fall below an adequate level. Once signaled, the appetitive need is met through purposeful social behavior, such as affiliation. If social contacts are hostile or unsupportive, then psychological and biological stress responses are heightened. If social contacts are supportive and comforting, stress responses decline. Positive contacts then lead to a decline in need and, in the context of stress, a decline in stress responses.*

They conclude that: “A picture of the emerging regulatory role of affiliation in response to stress and its biological underpinnings is coming into view.” (Taylor and Gonzaga 2007, p. 469)

#### *d. The Health Effects of Emotion*

General Effects. Emotional states in general also have very important health effects. “Aristotle was among the first to suggest the connection between mood and health: ‘Soul and body, I suggest, react sympathetically upon each other,’ he is credited with saying.” Indeed, Pert (1997, pp. 190-93) goes on to explain that: “Howard Hall ... in 1990 ... was the first to show that psychological factors, that is, conscious intervention, could directly affect cellular function in the immune system. ...

*If the immune system can be altered by conscious intervention, what does this mean for the treatment of major diseases such as cancer? ... Lydia Temoshok, a psychologist then at UCSF, showed that cancer patients who kept emotions such as anger under the surface, remaining ignorant of their existence, had slower recovery rates than those who were more expressive. Another trait common to these patients was self-denial, stemming from an unawareness of their own basic emotional needs. The immune systems were stronger and tumors smaller for those in touch with their emotions.*

*Can suppressed anger or other “negative” emotions cause cancer? ... Let me begin to answer by saying that I believe all emotions are healthy, because emotions are what unite the mind and the body. ... To repress these emotions and not let them flow freely is to set up a dis-integrity in the system, causing it to act at cross-purposes rather than as a unified whole. The stress this creates ... is what sets up the weakened conditions that can lead to disease. All honest emotions are positive emotions.*

Heart Rhythms. Some very interesting insights have come from the Institute of HeartMath about the heart’s role in healthy physiological function, where – according to McCraty, Bradley and Tomasino (2004/5, pp. 15-19) “the heart is now recognized by scientists as a highly complex system with its own functional ‘brain.’ ...

*... The nervous system within the heart (or ‘heart brain’) enables it to learn, remember, and make functional decisions independent of the brain’s cerebral cortex. Moreover, numerous experiments have demonstrated that the signals the heart continuously sends to the brain influence the function of higher brain centers involved in perception, cognition, and emotional processing. ... The heart also communicates information to the brain and throughout the body via electromagnetic field interactions. ...*

We propose that the heart's field acts as a carrier wave for information that provides a global synchronizing signal for the entire body. ...

... The rhythmic beating patterns of the heart change significantly as we experience different emotions. Negative emotions, such as anger or frustration, are associated with an erratic, disordered, incoherent pattern in the heart's rhythms. In contrast, positive emotions, such as love or appreciation, are associated with a smooth, ordered, coherent pattern in the heart's rhythmic activity. ...

More specifically, we have demonstrated that sustained positive emotions appear to give rise to a distinct mode of functioning, which we call psychophysiological coherence. During this mode, heart rhythms exhibit a sine wave-like pattern and the heart's electromagnetic field becomes correspondingly more organized.

- At the physiological level, this mode is characterized by increased efficiency and harmony in the activity and interactions of the body's systems.
- Psychologically, this mode is linked with a notable reduction in internal mental dialogue, reduced perceptions of stress, increased emotional balance, and enhanced mental clarity, intuitive discernment, and cognitive performance.

In sum, our research suggests that psychophysiological coherence is important in enhancing consciousness – both for the body's sensory awareness of the information required to execute and coordinate physiological function, and also to optimize emotional stability, mental function, and intentional action. Furthermore ... there is experimental evidence that psychophysiological coherence may increase our awareness of and sensitivity to others around us. ...

Another commonality is the role of positive emotions, such as love and appreciation, in generating coherence both in the heart field and in social fields. ... Heart coherence and social coherence may also act to mutually reinforce each other. As individuals within a group increase psychophysiological coherence, psychosocial attunement may be increased, thereby increasing the coherence of social relations. Similarly, the creation of a coherent social field by a group may help support the generation and maintenance of psychophysiological coherence in its individual members. An expanded, deepened awareness and consciousness results – of the body's internal physiological, emotional, and mental processes, and also of the deeper, latent orders enfolded into the energy fields that surround us. This is the basis of self-awareness, social sensitivity, creativity, intuition, spiritual insight, and understanding of ourselves and all that we are connected to.

Tomasino (2007, pp. 530-31) summarized the research at HeartMath thus:

*In short, positive emotions appear to broaden the scope of perception, cognition, and behavior and to enhance creative and intuitive capacities. Conversely, negative emotions tend to restrict perception, produce more reactive, rigid, and stereotypic patterns of thought and action, and have been found to be associated with reduced task performance and impaired intuitive judgments. ... In general, emotional stress and negative emotions such as anger, frustration, and anxiety lead to heart rhythm patterns that appear incoherent – irregular and erratic. ... In contrast, sustained positive emotions, such as appreciation, care, compassion, and love, generate a smooth, sine-wave-like pattern in the heart's rhythms.*

Fear and Love. Stress interferes with physiological functionality at all levels. Arguelles, McCraty and Rees (2003, pp. 15-16, 20) elaborate on some of the consequences of stress, which...

*...causes our system to get 'out of sync' – not only mentally and emotionally, but also physiologically. ... The result is emotional incoherence, increased energy drain, and added wear and tear on the body. ... During emotional stress, when the heart transmits a disordered signal to the brain and activity in the nervous system is chaotic or desynchronized, higher cognitive functions are inhibited – limiting our ability to think clearly, focus, remember, learn, and reason.*

The effects of positive feelings are the reverse, improving mental and bodily functions in diverse ways:

*In contrast, sustained positive emotions, such as appreciation, love, and compassion, are associated with highly ordered or coherent patterns in the heart rhythms, reflecting greater synchronization between the two branches of the autonomic nervous system and increased physiological efficiency. Thus, sincerely experiencing positive feelings helps us get (and stay) 'in sync' ... often resulting in enhanced focus, memory recall, comprehension, and creativity. ... Positive emotion-focused, coherence-building tools are effective in helping to stabilize nervous system dynamics in real time...*

They conclude with the hope that:

*A new consciousness about the heart may have profound implications not only for the transference of information and knowledge in our learning systems but for the cultivation of those aspects of human experience that are associated with wholeness: caring, giving, appreciation, nurturing, and love.*

*e. Positive Feelings and Human Performance*

So positive emotions have beneficial physiological health effects; they “have been demonstrated to improve health and increase longevity, increase cognitive flexibility and creativity, facilitate ‘broad-minded coping’ and innovative problem solving, and promote helpfulness, generosity and effective cooperation.” (Childre and McCraty 2001, p. 13) Seligman and Csikszentmihalyi (2000, p. 5), leading adherents of ‘positive psychology,’ describe the general approach of this discipline thus:

*The field of positive psychology at the subjective level is about valued subjective experiences: well-being, contentment, and satisfaction (in the past); hope and optimism (for the future); and flow and happiness (in the present). At the individual level, it is about positive individual traits: the capacity for love and vocation, courage, interpersonal skill, aesthetic sensibility, perseverance, forgiveness, originality, future mindedness, spirituality, high talent, and wisdom. At the group level, it is about the civic virtues and the institutions that move individuals toward better citizenship: responsibility, nurturance, altruism, civility, moderation, tolerance, and work ethic.*

Seligman and Csikszentmihalyi (2000, p. 7) add that researchers have found these positive individual traits “act as buffers against mental illness” calling “in this new century” for a “science of human strength.” Duckworth, Steen and Seligman (2005, pp. 629, 635-36) explain that: “Our proposed conceptual framework parses happiness into three domains: pleasure, engagement, and meaning. ...

*The first domain, the pleasant life, concerns positive emotion about the past, present, and future. ... The second domain is the engaged life, which consists of using positive individual traits, including strengths of character and talents. ... The third domain of positive psychology is the meaningful life, which entails belonging to and serving positive institutions. ... Positive psychology asks, “What are the institutions that enable the best in human nature?” An incomplete list of institutions that can cultivate positive emotion and positive traits includes mentoring, strong families and communities, democracy, and a free press. We believe that positive traits and positive emotions flourish best in the context of positive institutions. Because meaning derives from belonging to and serving something larger than oneself, a life led in the service of positive institutions is the meaningful life.*

Frederickson and Losada (2005, pp. 678-79) address such issues in terms of the patterns and requirements of ‘flourishing’ vs. ‘languishing.’ “*To flourish* means to live within an optimal range of human functioning, one that connotes goodness, generativity, growth, and resilience. ... Epidemiological work suggests that fewer than 20% of U.S. adults flourish and that the costs of languishing are high; ...languishing brings more emotional distress, psychosocial impairment, limitations in daily activities, and lost work days.” They explain that “a key predictor of flourishing is the ratio of positive to negative affect. ...

*A wide spectrum of empirical evidence documents the adaptive value of positive affect... Beyond their pleasant subjective feel, positive emotions, positive moods, and positive sentiments carry multiple, interrelated benefits. First, these good feelings alter people’s mindsets: Experiments have shown that induced positive affect widens the scope of attention, broadens behavioral repertoires, and increases intuition and creativity. Second, good feelings alter people’s bodily systems: experiments have shown that induced positive affect speeds recovery from the cardiovascular aftereffects of negative affect, alters frontal brain asymmetry, and increases immune function. Third, good feelings predict salubrious mental and physical health outcomes: Prospective studies have shown that frequent positive affect predicts (a) resilience to adversity, (b) increased happiness, (c) psychological growth, (d) lower levels of cortisol, (e) reduced inflammatory responses to stress, (f) reductions in subsequent-day physical pain, (g) resistance to rhinoviruses, and (h) reductions in stroke. And fourth, perhaps reflecting these effects in combination, good feelings predict how long people live: Several well-controlled longitudinal studies document a clear link between frequent positive affect and longevity.*

f. *Horizon Effects and Broadened Perspectives*

Although these authors do not employ the concept of ‘planning horizons’ in describing their “broaden-and-build theory” of positive emotions, their explanation thereof is so resonant with horizontal elements with respect to broadening human perspective, flexibility, openmindedness and general learning effects that the lesson is clear. Planning horizons offer an organizing principle for this research, while ‘horizon effects’ suggest their relevance to economic behavior. Frederickson and Losada (2005, pp. 679) explain the implications of their theory:

*The theory holds that unlike negative emotions, which narrow people’s behavioral urges toward specific actions that were life-preserving for human ancestors (e.g., fight, flight), positive emotions widen the array of thoughts and actions called forth (e.g., play, explore), facilitating generativity and behavioral flexibility. Laboratory experiments support these claims, showing that relative to neutral states, induced negative emotions narrow people’s momentary thought-action repertoires, whereas induced positive emotions broaden these same repertoires.*

The entire process is wholly horizontal in its expansion/retraction of the range of human awareness and choice:

*The theory holds that in contrast with the benefits of negative emotions – which are direct and immediately adaptive in life-threatening situations – the benefits of broadened thought-action repertoires emerge over time. Specifically, broadened mindsets carry indirect and long-term adaptive value because broadening builds enduring personal resources, like social connections, coping strategies, and environmental knowledge. ... These findings suggest that positive affect – by broadening exploratory behavior in the moment – over time builds more accurate cognitive maps of what is good and bad in the environment. This greater knowledge becomes a lasting personal resource. ... Put differently, because the broaden-and-build effects of positive affect accumulate and compound over time, positivity can transform individuals for the better, making them healthier, more socially integrated, knowledgeable, effective, and resilient. ... This evidence motivates our prediction that positive affect is a critical ingredient within flourishing mental health.*

g. *Adaptive Flexibility and Local vs. Global Stability*

Because Frederickson and Losada (2005, p. 680) define emotions as dynamic, complex “multicomponent systems that dynamically alter patterns of thinking, behavior, subjective experience, verbal and nonverbal communication, and physiological activity” and perceive them to reflect “two intertwined core concepts within nonlinear dynamic systems – namely, local unpredictability and global stability,” they see *adaptive flexibility* as one of the hallmarks of our emotional systems and their physiological impact. After reviewing the research on the plasticity of heart rate variability and the view that “fast and accurate perception seems to depend on chaotic neural systems,” they opine that: “In both cardiac and neurological systems, then, seemingly unpredictable local changes give rise to stable and flexible global outcomes.” They next apply this to human emotional systems:

*A similar dynamic emerges for positive affect systems. Given that positive affect broadens momentary thought-action repertoires whereas negative affect narrows those same repertoires, people are indeed less predictable in positive states than in negative states. The broaden-and-build theory holds that the momentary unpredictability characteristic of positive states over time yields resilience that allows people to flexibly adapt to inevitable crises. The links among positivity, local unpredictability, and global stability have been demonstrated empirically at multiple levels of analysis. Within individuals, people induced to feel positive emotions ... report wider arrays of action urges in the moment, which would make predicting their behavior more difficult. Relatedly, people’s trait positivity predicts greater variability and complexity within the microdynamics of their moment-to-moment moods. Despite this momentary unpredictability of affect and behavior, over time, people who regularly experience positive affect exhibit greater resilience to adversity. Within married couples, greater marital happiness is associated with less predictability from moment to moment as spouses interact, and yet, over time, these marriages are the ones most likely to last. Within business teams, higher levels of expressed positivity among group members have been linked to greater behavioral variability within moment-to-moment interactions as well as to long-range indicators of business success. And within organizations, positive experiences have been linked to broader information processing strategies and greater variability in perspectives across organizational members as well as to organizational resilience in the face of threat. The commonalities between affect systems and nonlinear dynamic systems raise the possibility that the complex dynamics of chaos underlie the proposed link between positive affect and human flourishing.*

#### *h. Interhorizontal Complementarity, Learning and Positivity*

One might interpret this information as a challenge to ‘interhorizontal complementarity,’ namely, as raising questions about the claim that ‘horizon effects’ are contagious, if longer horizons make one’s short-run behavior less and not more predictable. But entertaining a broader repertoire of behavioral options – indeed, all learning activity in general – is part of a longer planning horizon; an increase in short-term variability in a willingness to explore novel ideas and alternatives in the pursuit of successful learning will likely be infectious to others. Short-term variability is a part and parcel of learning activity; one tries new things and discovers their effects. Frederickson and Losada (2005, pp. 680-81) describe several lines of research “suggest[ing] that high ratios of positive to negative affect would distinguish individuals who flourish from those who do not.” They mention some “studies [that] show that mild positive affect characterizes the modal human experience” and state that: “This *positivity offset* equips individuals with the adaptive bias to approach and explore novel objects, people, or situations.” Other studies imply “‘bad is stronger than good’ ...

*The implication is that to overcome the toxicity of negative affect and to promote flourishing, experiences of positivity may need to outnumber experiences of negativity, perhaps at ratios appreciably higher than those typically represented in the modal positivity offset. ... The reformulated balanced states of mind model suggests that optimal mental health is associated with high ratios of positive to negative affect.*

So learning activity is a part of positive emotional affect; the long-run effects show up in the form of “global stability” due to greater resilience in the face of crisis, surprise or other disruption. But there is also a role for ‘negativity’ in our emotional makeup, and ‘positivity’ must be genuine to contribute to healthy behavior. As the authors (Frederickson and Losada 2005, pp. 684-85) explain, “problems can occur with too much positivity and appropriate negativity may play an important role within the complex dynamics of human flourishing. Without appropriate negativity, behavior patterns calcify. We use the term *appropriate negativity* because we suspect that certain forms of negativity promote flourishing better than others” such as conflict engagement in marriage (vs. disgust and contempt which “are more corrosive”).

*Just as negativity within the dynamics of human flourishing must be appropriate, positivity must be both appropriate and genuine. Studies of human nonverbal behavior document that smiles that are ingenuine or otherwise disconnected from current circumstances lose credibility as expressions of internal states and correlate with regional brain activity typical of negative emotions and abnormal heart function, suggesting that feigned positivity may be more negative than positive. These findings underscore the importance, in the pursuit of human flourishing, of seeking genuine positivity – meaningfully grounded in the reality of current circumstances – rather than feigned, forced, or trivial positivity.*

This is similar to Pert’s (1997, pp. 192-93) point, as introduced above, that “*all emotions are healthy, because emotions are what unite the mind and the body. ... All honest emotions are positive emotions.*” So now we have arrived at the point where all this information needs to be summarized, synthesized and drawn together.

#### **V. Conclusion and Summary**

The primary question asked in this paper is: How should we organize society to promote human well-being? The basic issue is whether competition or cooperation is superior to this end, where most economists see a case for competition as the very standard for efficiency and human welfare. But in network contexts of fully interdependent phenomena, substitution and complementarity occur in a nondecomposable mix; since complementarity calls for cooperation as efficient, the case for competition needs to be questioned in this regard. Does substitution or complementarity dominate in economics? It has long been asserted (with little dissent) that substitution (thus scarcity models) serve as the core of economics, while complementarity gets short shrift, due to a broad acceptance of diminishing over increasing returns in economic production. There is no foundation for diminishing returns assumptions, save in short-run production theory (Jennings 2009b); the general long-run technical case will favor increasing returns, implying a generalized complementarity in all long-run applications (Kaldor 1972, 1975). For intangible outputs and horizontal aspects of economics, substitution does not apply; here the

case for cooperation is strong and well-supported (Jennings 2010a). The point of this paper is to make a more robust claim for cooperation on the basis of its psychophysiological health effects.

First, the two cultures of competition and cooperation were characterized – simplistically – as cultures of fear and love, where the former (rivalry) emphasizes stress and strife in human relations based on a view that we all share a basic conflict of interests in the allocation and distribution of economic goods. So competition places us in opposition to each other in an individualistic culture resistant to human community and devoted to personal acquisition and advancement against one's peers' similar efforts. This culture of fear is contrasted with a culture of cooperation, based on complementarity or a belief that human relations are characterized by a concert of interests. So in this setting, community counts along with a general recognition of the interdependence of phenomena in economics, such that caring and compassion are the twin hallmarks in a culture of love. Furthermore, the role and relevance of 'horizon effects' were raised, to add that longer and broader horizons are also important in any evaluation of these two systems. Such criteria, although unfamiliar to most economists, suggest that learning activity and adaptive flexibility in a dynamic, complexly interdependent domain of action are important as standards for any proper assessment of system performance for human well-being. Competition and cooperation entail economic cultures of 'fear' and 'love' for the purposes of this paper; which of these social systems seem more conducive to human welfare? Research in human neuropsychology and physiology offer an answer.

A suggestion was offered, from management theory, on hierarchical organizations that treat their members as if they were children, that symptoms of ill health – of “frustration, failure, short time perspective and conflict” – would result, disruptive of functionality and fragmenting effort through rising “competition, rivalry, intersubordinate hostility and ... a focus toward the parts rather than the whole” (Argyris 1971, pp. 262-63, 268-69). This could be construed as a description of our economic culture, with the additional insight that these persistent and ubiquitous styles of behavior may indeed be pathological symptoms of illness attributable to higher-order need deprivation in the way that McGregor (1971, pp. 310-11) described. Kohn's (1986, pp. 55, 143) view of competition is even more negative, that “competition ... does not promote excellence. ... The chief result of competition ... is strife.” For many organizational theorists, an economic culture of competition is part of the problem, manifesting some pathological symptoms in the ensuing behavior reflected in 'horizon effects' and in widespread organizational stress.

Some findings in neuropsychology also imply a competitive failure in the social provisioning process in its promotion of human health and well-being. Designing a social world around the opposition of interests is not conducive to flourishing human communities if we are social creatures as a lot of psychologists say. If we are also hard-wired for empathy, or programmed by evolution in favor of fellowship – protecting each other and ourselves through affinity links – such competitive frames sever relations, suggesting a harmful effect. Indeed, a great deal of research shows social support to be an important part of physiological functionality, psychological health and human well-being. Social isolation and loneliness has been tied to illness and disease of various sorts – as “a major risk factor for morbidity and mortality” – and will affect “one's daily emotional life” (Norris and Cacioppo 2007, p. 88). The World Health Organization calls stress “one of the most significant health problems in the 21<sup>st</sup> century” as it is “a close correlate or even a determining factor of the onset of different diseases” (Kudielka et al. 2007, pp. 56-57) such as abnormal heart rhythms, immunosuppressive effects, susceptibility to infection, and diabetes, to name a few (Taylor and Gonzaga 2007, p. 456). Indeed, if humans are born with “an affiliative neurocircuitry ... in response to stress” and “if social contacts are hostile or unsupportive” – as is likely in a culture of competitive 'fear' – “then psychological and biological stress responses are heightened. If social contacts are supportive and comforting, stress responses decline.” (Taylor and Gonzaga 2007, p. 457) An economic culture resistant to affiliative responses shall lead to widespread ill health, both mental and physical.

Indeed, positive emotions in themselves show important health effects; suppressed anger, for example, links to cancer and other diseases (Pert 1997, pp. 190-93). Emotional states are especially important in their effects on the heart, being implicated not only in cardiovascular health but in what the Institute of HeartMath calls “psychophysiological coherence” which apparently plays a vital role in synchronizing bodily rhythms and maintaining optimal mental function along with emotional balance. Here, “love and appreciation” are routes to

such coherence and balance with contagious social effects (McCraty, Bradley and Tomasino 2004/5, pp. 16-18). “In short, positive emotions appear to broaden the scope of perception, cognition, and behavior and to enhance creative and intuitive capacities. Conversely, negative emotions tend to restrict perception, produce more reactive, rigid, and stereotypic patterns of thought and action, and have been found to be associated with reduced task performance and impaired intuitive judgments.” The implications of this research are that “appreciation, care, compassion and love” (Tomasino 2007, pp. 530-31) along with “giving [and] nurturing” – all “aspects of human experience that are associated with wholeness” (Arguelles, McCraty and Rees 2003, p. 20) – should be a vital part of and duly encouraged by any social system meant to promote human welfare or ‘flourishing.’

The notion of ‘flourishing’ entails living “within an optimal range of human functioning” which is what this paper reviews in its social links (Frederickson and Losada 2005, p. 680). Positive feelings, especially toward other people, are an essential feature of flourishing in this sense; a competitive fear-based system meets none of these social requirements, whereas a more cooperative frame encouraging care and compassion for others, such that love fosters healthy relationships and better performance as well, is strongly conducive to human welfare in all its diverse senses. Much of the notion of ‘flourishing’ is *horizontal* at its core. Longer planning horizons seem so much in line with these studies that the economics and the psychology all come together here. Opening up planning horizons as an index of maturity offers psychology and economics an organizing principle likely to offer research opportunities in both fields. Such collaboration ought to open new realms of understanding for all of us who strive for improvement in our social sphere. With psychologists showing how long planning horizons might be encouraged effectively, and economists seeing horizontal lengthening as a complementary process in economic development, the needed shift in social cultures away from opposition and competition toward cooperation and compassion could be achieved. The orthodox substitution assumptions in economics simply are wrong, and they have harmful effects in all the realms addressed in this paper. Is it not time for renewal, to move from fear to love for each other?

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