

The Nature and Value of Efforts

1. Summary of the research plan

We make efforts to lift heavy weights, to solve problems, to concentrate, to stop smoking, to climb mountains, to convince others, to stay calm, to understand obscure texts, to conceal one's vices, to resist temptations, to gather information, to earn money, to overcome one's shyness, to win games, etc. Not only do we *make* efforts, we also *value* efforts in various ways: we deem them unpleasant, praiseworthy, efficient, vain, irrational, tenacious, etc. Effort is a central concept not only of our ordinary psychology and ethics, but also of many sciences: efforts are recurrently invoked in psychology, economics, sociology, law, or philosophy. In spite of its ubiquity in ordinary and scientific thinking, virtually no attempt has been made so far to formulate a general theory of effort amenable to accommodate all varieties of efforts and to explain their values. The goal of this project is to remedy this deficiency by first, trying to identify what all the multifarious kinds of efforts have in common—the nature of effort; and second, by elucidating the main values which accrue to efforts in virtue of their nature. What are efforts, and what are they worth?

These two questions correspond to the two interdependent sub-projects of this project. Sub-project A pertains to theoretical philosophy and bears on the *nature of effort*; Sub-project B pertains to practical philosophy and bears *on the value(s) of efforts*. Assessing the values of effort trivially requires being clear about what efforts are; but the reverse is also true: the way we value efforts provides crucial clues about what we take efforts to be. Accordingly the two sub-projects will be led in parallel and close collaboration.

The project will review and assess the main various possible accounts of efforts and their value, and pay particular attention to force-based accounts. Force-based accounts purport to capture the informal idea that key to the nature, pleasantness and moral worth of effort, is the striving against some *resistance*. On such accounts, the *nature efforts* is understood in terms of exertion of physical or mental forces against some resistive forces; the chief *hedonic value* of efforts is explained in terms of the pleasures taken in challenging activities; and the *moral worth* of effort is equated to the value of tenacious striving against adversity. Both the hedonic and the moral values of effort, so construed, are grounded in the opposition between active and passive forces that lie at the heart of effort.

2. Research Plan [79813 characters with spaces]

2.1 Current state of research in the field

The concept of effort has been recurrently invoked in many areas of philosophy (philosophy of action, causation, mind, law; moral and political philosophy) as well as outside of philosophy (in psychology of emotion, motivation, learning and education, tactual perception, attention; evolutionary psychology; microeconomics; labor, behavioural economics; exercise physiology; sport sciences; biomechanics; sociology; legal studies). As abundant and fruitful the researches connected to effort have been, no clear attempt has been made so far to spell out *what all efforts –muscular, of attention, of will, of persuasion, financial, etc.– have in common*. Effort tends to be more *used* than *studied* (no Wikipedia entry on effort, for instance, is to be found as of today).

The following is an overview of some main research areas invoking the concept of effort. Given that effort is a transversal concept cutting across a wide variety of disciplines, and given that no attempt has been made so far at reviewing the main researches connected to efforts, the following list is doomed to be incomplete (bringing it to completion shall be one main task of the first months of the project, see 2.4).

2.1.1 Works using effort as an *explanans*

Most effort-related researches do not such much target effort as an *explanandum*, than use it as a key *explanans* for other phenomena. On top of the protean “principle of least effort” (introduced by Ferrero, 1894, furthered by Hull, 1943 and Zipf, 1949), recurrently invoked as a key assumption in ethology, ecology, linguistics, economics or psychology, efforts have been used to explain:

(i) *The consciousness of a distinction between ourselves and the external world*. “There is no commoner remark than this, that resistance to our muscular effort is the only sense which makes us aware of a reality independent from ourselves.” writes James (1880), albeit disapprovingly. The idea is found among many others in Malebranche, Berkeley, Condillac, Peirce, Maine de Biran, Destutt de Tracy, Schopenhauer, Dilthey, Scheler, Durkheim, and remains influential in contemporary psychology and philosophy (See Massin, 2009 518n. 1 and 2011b for a detailed list of references);

(ii) *Absorption*. By contraposition, *effortlessness* has been advanced to explain cases in which the subject-object distinction vanishes, in particular when using of tools (Lotze, 1888, 588-9; Stout, 1931: 92-3; Katz, 1925; Gibson, 1966; Klatzky and Lederman, 1999; Martin, 1995; Yamamoto and Kitazawa, 2001; Wagmann & Carello, 2003; O’Shaughnessy, 2003; de Vignemont 2007). The vanishing of the subject-object distinction in actions performed with ease is also a central theme in the philosophy of Tchouang-Tseu (see Billeter, 2012);

(iii) *The distinction between actions and mere happenings*. Lewes (1878) appealed to effort to distinguish the fact that I raise my arm from the fact that my arm goes up. Likewise several volitionists analyse actions in terms of volitions and equates volitions to tryings or strivings (McCann, Ginet, Lowe...see Massin, 2014a for detailed references);

(iv) *The possibility of free will* (Kane, 1996: 128; see Clarke, 1999; Coffman, 2004 and Mele, 2006; for discussions of Kane’s concept of effort of will);

(v) *Weakness of will* (Holton; 1999, 2009: chap. 6);

(vi) *The sense of agency* (Pacherie, 2007, 2008; Bayne, 2011; Preston & Wegner, 2009 a, b; Demanet et al., 2013; Dries, 2013);

(vii) *The perception of causal relations, forces and solidity* (Newton, see Jammer: 1999; Locke 2008, II, iv; Maine de Biran, 2002; Broad, 1923: 162; Spiegelberg, 1960, vol. 2: 662; Fales, 1990: 12; Beebe, 2009; Schrenk, 2014; Marshall, 2015);

(viii) *The nature of achievements* (Bradford, 2014: chap. 2);

(ix) *Haptic perception* (e.g. McCloskey, Ebeling, and Goodwin, 1974; Lederman, Ganeshan, and Ellis, 1996 ; Turvey, 1996; Turvey & Carello, 2011);

(x) *Failure to maximise monetary payoff* (Smith and Walker, 1993; Camerer & Hogarth, 1999 — the concept invoked here being interchangeably called “mental effort”, “effort of cognition”, “decision costs” or “mental labor”).

(xi) *Improved memorization of demanding linguistic stimuli* (the “processing-difficulty effect”: Walker, Jones & Mar, 1983; O’Brien & Myers, 1985; the “bizarreness effect”: Imai & Richman, 1991).

2.1.2 Works on the feeling of effort

The awareness, feeling or sense of effort has drawn a lot of attention, which culminated at the end the 19th century in the controversy between *centralists and peripheralists*. While centralists—Bain, Müller, Helmholtz...—equated the feeling of effort to the feeling of efferent commands of our will, and *peripheralists*—Bastian, James, Dewey...—equated the feeling of effort to the afferent feelings of muscles contractions (see Jeannerod 1983: 121-140; 1996: 104-114; 2002: chap. V and Forest 2007 for presentations). The dispute is to some extent still on-going (see Morree & al., 2012; Marcora, 2009 for recent defences of the centralist view, and Sirigu, 2006; Lafargue and Franck, 2009 for some intermediate approaches in terms of comparator-model).

Although the debate constitutes one high point in research on effort, it is worth noting that the relation between effort and the awareness of effort is left widely unaddressed in its context. Most protagonists waver freely between talk about *effort* and talk about the *feeling* of effort, assuming that effort just *is* a feeling.

2.1.3 Works on sub-species of efforts

Other research works target the nature of various *sub-species* of effort. They bear on:

(i) *Muscular effort* (Bannister, 1956; Nubar & Contini, 1961; McHardle & al. 2009);

(ii) *Effort of attention* (Kahneman, 1973) or *cognitive effort* (Ackerman, 2011; Kurzban & al., 2013; Westbrook & Braver, 2015), or on some aspect of such efforts, such as their *subjective difficulty* (Robinson & Morsella, 2014).

(iii) *Moral effort, effort of will* or *effort to resist temptation* (Campbell, 1939; Holton, 2009; Fehr, 2002; Knoch & Fehr, 2007).

2.1.4 Works on determinants of efforts

Another substantial body of research bears on the various *determinants* of effort: what determines that we make, pursue or withhold efforts?

(i) *Physiological and neurobiological determinants of effort* (Salamone & al. 2007; Gailliot, & al 2007a, 2007b; Gendolla & al. 2012; Kurniawan & al. 2011; Treadway & al, 2012; Radulescu & al., 2014).

(ii) *Psychological determinants of effort*. How are the worthiness of the task—the rewards—the chance of success, the difficulty of the task, our own skill, etc., weighted against each other so as to determine whether an effort shall be undertaken (Brehm and Self, 1989; Marien & al. 2014; Westbrook & Braver, 2015)? At which condition do we persist in goal striving when goal disengagement becomes an issue (Brandstätter & al. 2013a,b)? How do depressive symptoms affect effort-making (Silvia & al., 2014; Brinkmann & al.)?

(iii) *Socio-economical determinants of efforts* have been studied in sociology (Baldamus, 1961) and behavioural economics: workers appear to modulate their effort depending on (a) the difference between their actual wage and the wage they consider as fair (the “fair wage hypothesis”, Akerlof & Yellen, 1990); (b) whether the wage has been fixed by third party (“responsibility-alleviation”, Charness, 2000); (c) the evolution of other’s workers wages (Cohn & al. 2014), etc.

2.1.5 Works on cognate concepts.

A fifth group of researches, although they do not explicitly mention efforts, target concepts that are tightly connected to it. The most relevant works here bear on the concept of trying. Plausibly, all efforts are tryings—although the reverse may not hold: Waismann (1994, 72) writes: “‘To try’ seems to mean less than ‘to make an effort’; there is no reference to any energy in ‘trying’” (see also Hacker, 2000, 571-2; Glock, 1996). *Effortless tryings* may include *preventive tryings*, such as trying to cause a draught by not closing the window. If efforts are sub-species of tryings, discussions about trying readily generalize to efforts. Three of them are:

(i) *Trying and action*. One common view is that trying to Φ is an essential ingredient of the action of Φ -ing. The view comes in two main versions: either *trying to Φ* is held to be a common ingredient of both the action of Φ -ing and of the failed attempt to Φ ; or *trying to Φ* is held to be identical to the action of Φ -ing in case of success, but to be a *sui generis* mental event in case of failure. Against this standard approach, some have argued *that rather than analysing actions in terms of tryings, tryings should be analysed in terms of actions* (see Massin 2014a for detailed list of references).

(ii) *The limits of trying*. James (1890) noticed that “The sense of impotence inhibits the volition”. Ludwig (1995) argues along similar lines, in answer to Adams (1995), that one cannot try to do what one thinks is impossible; Schmid (2011) argues that such ability-constraints on tryings are affective rather than cognitive.

(iii) *Trying and responsibility*. Griffith (2007) argues that trying is the locus of freedom and responsibility; Scheler (1973a) argues that strivings are the primary bearers of moral values. In philosophy of law, the penal status of *attempts* constitutes a main research area (see e.g. Duff, 1996; Yaffe, 2010).

On top of the concept of trying, the important but scattered literature on the concepts of *labour* (Hamesse, 1990; Applebaum, 1992; Theocarakis, 2010) and *fatigue* (Ackerman, 2011; Noakes, 2012; Hockey, 2013) will be of important help to understand the nature of effort.

2.1.6 Works on the values of effort

Several research works, finally, hinge on the idea that efforts are valuable. Effort is recurrently claimed to constitute one main basis of desert (Sher 1979; Sadurski 1985a,b; Bradford, 2014). Furthermore, the idea of a moral value of effort is reflected in influential conceptions of *justice*, *economic values* and *ownership*:

(i) *Desert-based conceptions of distributive justice* argue that wealth should reward efforts (Sadurski 1985a,b; Milne, 1986; Miller, 1996; see Lamont, 1995 for critics).

(ii) *Labour theories of economic value* (Locke, 1988—see Vaughn 1978; Smith, 1887; Ricardo, 1891; Marx & Engels, 1887; see Carson, 2004 for a recent reassessment) have it that the economic value of a good is equivalent to the effort needed to produce it (or to the effort spared to its owner). Thus Adam Smith recurrently appeals to “hard work”, “hardship endured”, “toil and trouble” and the like to explain economic value; Bastiat (1996) and his disciple Perry (1878) argue that efforts, rather than goods, are the fundamental “exchangeables” — the basic entities we in fact trade. Hearn (1864) proposed to define economics as the “science of efforts to satisfy human want”. Labour theories of economic value have by now been superseded, but their driving intuition — that efforts confer value to their products— remains an important object of investigation through studies of “effort heuristics” (Kruger & al. 2004) or on “effort justification” (Aronson & Mills, 1959); a close idea is also investigated by studies on the “Ikea effect” (see Norton & al. 2011), according to which people value more highly goods that they contributed to create.

(iii) *Labour theories of appropriation* Locke (1988) famously claimed that one becomes the owner of a good by “mixing” one’s labour with it. That ownership is as a retribution for one’s effort has been advanced in recent discussions about intellectual property rights (Rosenberg, 2013).

2.1.7 Limits of the present researches

Despite significant scientific advances on the determinants, roles, and sub-species of efforts, works addressing the question of *what all efforts have in common, in virtue of which they are efforts*, remain absent from the actual state of the art. With respect to such a general definition of effort, the present state of the art remains lacking in five respects:

1. While substantial works have been pursued on the nature of some *species* of effort (muscular, cognitive...), *virtually no work on the effort genus is to be found*.

2. As noted by Richter and Wright (2014), in what may be the only attempt so far at bringing together researches from various fields about effort, *research works on effort remain scattered*: they target different functions, features or species of efforts, and remain widely isolated from each other.

3. Works on the determinants and functions of efforts largely rely on an *implicit* and *pre-theoretical* understanding of effort. Although such an intuitive grasp has proven sufficient to investigate the various underpinnings and roles of efforts in contexts, *a lack of explicit definition may impede the integration of the manifold researches on efforts*.

4. Relatedly, *the recurring intuition that efforts display some essential connection with dynamical concepts such as forces or energy remains largely unelaborated* (this may be due to the comparatively little attention that has been paid in both psychology and philosophy to dynamical concepts by contrast to spatio-temporal ones).

5. As another consequence of this lack of definition, *research on the value of efforts has remained largely disconnected from research on their nature*. What, in the nature effort, grounds its moral worth is a question that remains largely unaddressed.

It is the goal of that project to help remedy these insufficiencies by developing a general definitional framework accounting for what all and only efforts have in common, in virtue of which they are efforts and have the value their have.

2.2. Current state of the applicant's research

2.2.1 Works related to sub-project A

(i) *Desire and trying*. “Desires, Values and Norms” addresses the nature of desires in light of their formal objects; “How to do Things with Wants” defends the abovementioned action-theory of trying (2.1.5, i), on which the force-based account of efforts hypothesised in sub-project A shall partly rely.

(ii) *Forces*. My two papers on the *ontology* of forces (“The Metaphysics of Forces” ;“The Composition of Forces”) and my two paper on their *epistemology* (“Touch” with Frédérique de Vignemont) will provide crucial help in the formulation and assessment the force-based view of efforts.

(iii) *Self-world dualism*. My two papers “Resistance and Existence” and “Le Mutisme des Sens”, together with my first dissertation, *The Objectivity of the Sense of Touch* investigate the idea that the feeling of effort may (internally) justify our belief in an external world (2.1.1, i), which constitutes an important upshot of sub-project A.

(iv) *Intentionality of feelings and sensation*. The papers “The Intentionality of Pleasure and Other Feelings” and “Brentano on sensations and sensory qualities” lay the ground for the objection introduced below against the view that efforts are feelings or sensations (rather than objects thereof).

Sub-project A will also benefit from extensive teaching materials on philosophy of mind and philosophy of action.

2.2.2 Works related to sub-project B

(i) *Pleasure and pain*. The assessment of the *unpleasantness* of effort will build upon former works the unpleasantness of pleasure and pain (two forthcoming paper: “The Value of Pleasure”, “Bad by Nature, An Axiological Theory of Pain”, two submitted papers “The Value of Pleasantness”, “Suffering Pain”, and my second dissertation, *On Pleasures*).

(ii) *Mixed feelings*. The paradox of pleasant but difficult efforts (see 2.3.3.1) will be addressed by drawing on former works on mixed feelings (“Bitter Joys and Sweet Sorrow”; “Pleasure and its Contraries”).

(ii) *Value theory*. The examination of the *moral and hedonic value of effort* will make heavy use of my recent works on value theory and deontic logic (*On Pleasures*, “Review of Personal Value, Toni Rønnow-Rasmussen”, “Grounding moral value”, “Desires, Values and Norms”, “Optimism”).

(iv) *Social ontology*. The connection between the moral worth of effort and labour theories of economic value and ownership will be assessed in the light of three recent papers “What is Ownership?”, “The Metaphysics of Economic Exchanges” (with Emma Tieffenhach), “Happiness and Wealth” (with Kevin Mulligan).

Sub-project B will also make use of important teaching materials in ethics, value theory, deontic logic and philosophy of economics.

2.3. Detailed research plan

The present project bears on the nature and value of efforts, and relies on the assumption that these two questions, though distinct, are closely interconnected. Accordingly, the project is divided into two sub-projects, meant to be led in close collaboration and to shed light on each other. Sub-project A belongs to theoretical philosophy and bears on the *nature of effort*; Sub-project B concerns practical philosophy and bears *on the value(s) of efforts*. The reason why sub-project B depends on sub-project A is familiar enough: values are grounded in natural properties so that if some (hedonic, moral...) value(s) accrue to effort as a matter of necessity, such values are plausibly grounded in some essential features of efforts.

That sub-project A depends in turn on sub-project B may first seem less obvious. The hypothesis however is that *important insights into the nature of effort are to be gained by scrutinizing the way we value efforts*. A first reason is that three of the most prolific research areas about effort —*ethics, economics and criminal law*— approach it from a normative perspective and that we should not deprive us from their input. Second, it shall be assumed that *ceteris paribus*, accounts of the nature of efforts that fit with our ordinary evaluations of effort are to be preferred. Here are two concrete examples where considerations about the value of effort help shedding light on their nature. (i) Efforts have often been equated with *feelings* of a special kind. This view seems however at odds with our valuing efforts as praiseworthy: we generally do not praise people for their feeling; we rather praise them for their actions. If true, the way we value efforts gives us reason to *reject* some views on the nature of efforts, namely that they are feelings. (ii) According to a broadly Nietzschean account of the value of effort (B.2), the moral worth of effort consists in the agonistic value that accrues to our active striving against some resistance. If true, then making clear why we value effort might even suggest some positive views about the nature of effort: namely that effort involves the activity of striving against resistance.

There is therefore a tight independency between investigations into the nature of effort and investigations into their value, which is why the two sub-projects will be led together and in close collaboration.

Sub-project A: The Nature of Efforts

A.1 The logic of effort

Effort-expressions appear to fall within five main syntactic categories:

1. *Referential*. “Effort” is a referring expression: “Efforts are praiseworthy”, “Julie’s made an effort to...”
2. *Predicative*. Talk about effort may also use verbs such as “to strive for/against”. Such verbs function as predicates taking two names to make a sentence: “Julie strives for justice.”; “Scientists strives against biases”.
3. *Hybrid*. Effort-statement may use verbs such as “to endeavour”, “to strive *to*”. Such verbs do not function as predicates: rather, they take a name on their left (referring to an agent) and an infinitive sentence on their right, to form a sentence (they are hybrid expressions: “as it were predicates at one end and connectives at the other”, Prior 1971: 19).
4. *Attributive*. Efforts are also expressed through adjectives, taking names to make complex referring expressions, such as “Julie’s effortful action led her to...”.
5. *Adverbial*. Finally, effort-statements may rely on adverbs or predicate modifiers, such as “Julie tried hard to...”, “Julie acted effort-fully/effortlessly to...”.

Getting clear on the relations between these various logical forms of effort-expressions shall constitute a necessary first step in the understanding of the nature of effort. One initially plausible proposal is that (2) “*x* strives for *y*” is elliptical for (3) “*x* strives to bring about/promote *y*”. This corresponds to a familiar propositionalist move in the handling of objectual attitudes, commonly adopted for desires (e.g. Ross, 1970; Larson & al. 1997; Searle, 1983: 30; see however Forbes, 2006). Another plausible view is that

(1)“Julie’s effort to...” can be rephrased in terms of (5) “Julie’s effortful action to...”. A more contentious issue concerns the relation between referential and predicative effort-statements. That the logical forms of such referential expressions should be taken seriously constitutes an important assumption of the force-based model to be introduced below. However, building on Bennett (1988), Ruben (2013, 2015, 2016) has recently argued that the basic form of the *trying*-statements is not referential but predicative. If effort-statements are species of trying-statements, Ruben’s argument will need to be carefully addressed in order to assess the tenability of force-based account of effort.

A.2 Four main approaches to efforts

(1) *Effort primitivism*. The identification of efforts with feelings has led some authors to conceive of efforts as indefinable raw feelings or primitive sensations. The view is explicitly endorsed by Maine de Biran (2002: 115sq) and more recently favoured Bradford (2014:39). It entails that the “of” in “a feeling of effort” is *specificatory* (as in “a piece of cake”) rather than *intentional* (as in “the seeing of a dog”). The feeling-view clashes however with three intuitions about effort:

a. Efforts are sometimes *productive*: one can lift weights, convince people, solve equations or win the tour de France thanks to one’s efforts. Not so with feelings.

b. Efforts are, under certain conditions, *grounds for desert and praiseworthiness* (sub-project B). This does not obviously apply to feelings.

c. Efforts do not *happen* to us, but are rather *made* by us, contrary to feelings.

If true, *pace* the feeling-view, the “of” in the “feeling of effort” might be the *intentional* “of” after all: feelings of effort may be feeling-acts directed at efforts as their intentional objects. Feelings of effort bear on efforts. Efforts may then be no so much feelings than actions.

Once the distinction between effort and the feeling thereof is reinstated, effort-primitivism becomes less appealing. Can effort be analysed? Putting together proposals made in various area of this scattered research field, three broad kinds of definitions of effort emerge: *comparator-based accounts*, *resource-based accounts* and *force-based accounts*.

(2) *Comparator-based accounts*. An influential proposal meant to reconcile peripheralism and centralism about effort (see 2.1.1) argues that the feeling of effort consists in, or arises from, a comparison between the efferent order sent by the will, and the subsequent afferent signals received from the muscles. In cases of partial mismatch, some feeling of effort would arise. This account, anticipated by Dilthey (1947: 107-108) found its first technical formulation in Von Holst & Mittelstaedt (1950)’s description of efference-copy mechanism, and has been constantly refined since then (see Frith 2012 for an overview). Comparator models have been widely used to explain the phenomenology of agency as well as various related delusion and pathologies (see e.g. Blakemore & al. 2002; Haggard, 2005; Bayne & Pacherie, 2007; Pacherie, 2008; Bayne, 2011) but also the feeling of effort (Jeannerod, 1983; Lafargue and Franck, 2009).

Comparator-based accounts *as applied to efforts* raise two problems that will need to be carefully assessed. First, like centralism and peripheralism, they seems to be accounts of the *feeling* of effort, rather than of effort as such. Second, comparator-based accounts may rely on a conflation between, on the one hand, the *success* or *failure* of effort, and, on the other hand, the *intensity* or *difficulty* of effort. Intense efforts may succeed: in such cases no mismatch between the intended and obtained results is to be found, and yet the intensity of the efforts is high.

(3) *Resource-based accounts* define efforts in terms of the “expenditure”, “investment”, “consumption”, “allocation” or “depletion” of *energy* or *resources* so as to reach one’s goals. One main rationale in favour of the resource-based accounts consists in the abundant empirical literature showing that prolonged mental efforts negatively impact performance and efficiency over time (e.g. Arai, 1912; Scerbo & al., 2001; Lorist & &l., 2005 Warm & al. 2008).

There are two main sorts of resource-based accounts of effort (Kurzban & al. 2013). The first appeals to some limited but *non-depletable* resource, such as attention (Kahneman; 1973): focussing one’s attention on some task leaves less attention available for other tasks, but the total amount of attention remains constant; the second appeals to a limited and *depletable* resource, such as energy (Gendolla and Wright 2009): using energy to perform a task not only leaves less energy available for other tasks, but also decreases the total amount of energy.

Approaches that appeal to depletable resources come in different levels. Physiological approaches appeal to *metabolic resources*: glucose depletion being the main candidate (see Gailliot & al. 2007b and Gailliot, & Baumeister 2007a for a review). On a functional level, depletion of a *computational capacity* is often appealed to (Westbrook & Braver, 2015). Another influential albeit increasingly controversial proposal equates the resources to be depleted in efforts to *strength of self-control*: effortful actions, on this hypothesis, “consumes one’s self control”, leaving one in a state of “ego depletion”(see Baumeister & al. 2000 for a defence; Hagger, 2010 for a state of the art; Inzlicht & al. for an account of ego depletion that avoids positing such a controversial resource of self-control). These different levels of approaches to the resource depleted in effort are compatible: thus glucose is often held to be the realiser or substrate of self-control.

Approaches appealing to *non-depletable* resources, on the other hand, have been recently refined thanks to the concept opportunity-costs (Kurzban & al. 2013; Kurzban, 2016). On this proposal, the cost of allocating some cognitive resource to a task is not a function of what the task intrinsically demands, but rather corresponds to the next-best alternative to which one renounces when performing the task. Thus, the cost of solving a mathematical problem when the next-best alternative is mind-wandering is relatively low, while the cost of solving that same mathematical problem when the next-best alternative is to have dinner with friends is higher.

One other way to describe opportunity-costs of is in terms of the degree in which one is *torn* between two actions courses. Instead of the concept of energy, another concepts that naturally come in mind to describe such cases is that of *tension*, which lie at the heart of the third kind of account of effort.

(4) *Force-based accounts* of efforts explain efforts in terms of *forces exerted to reach some goal*. This is in accordance with the etymology of the word, that comes from the old French “esforz”, meaning “exerting strength”. Maine de Biran (2002) introduced a first version of force-based account (he presents it only as an account of the *causes* of the primitive feeling of effort, a complication I shall here ignore). According to his proposal, an effort consists in the exercise of some “hyperorganic” force, coming from the will, which encounters an opposite muscular force (2002: 125). Although suggestive, Maine de Biran’s proposal relies on the assumption that *psychical and physical forces can compose with each other* (an assumption all the more crucial to him that he equates efforts to the pineal gland linking the mind and the body). However, even if “hyperorganic” forces are granted (see A.3), it remains doubtful that such forces can compose with physical ones, such as gravitation, so as to affect the motion of bodies.

A second version of force-based accounts avoids this problem. According to it, *a motor effort consists in (i) an agent exercising a mechanical force on a body in order to make it move or stay at rest (ii) that mechanical force being at least partly counterbalanced by an opposite force: the resistive force*. The two forces that here oppose each other are mechanical. The locus of mental causation is no more at the meeting point of the two forces essential to efforts, but, prior to that, in between the agent and the muscular forces she exerts. The proposal therefore avoids composing physical forces with psychical ones —at the price of leaving mental causation unexplained, as shall be done in the present project (see 2.3.4).

A.3 Challenges facing force-based accounts

One main goal of sub-project A shall be to give a more complete formulation of such a force-based account of efforts and to assess how it fares with respect to rival accounts. At least four worries will have to be addressed:

1. *Composition of forces.* Force-based accounts are committed not only to the reality of forces (see Massin 2009 for a defence), but also the reality of their composition, which even realists about forces tend to reject for fear of causal over-determination between component and resultant forces. Beside, the proposal as it stands fails to account for efforts in which the resistive force is not opposite to the force exerted but say, orthogonal to it, as the force exerted by the current of a river on the swimmer trying to cross it. To deal with such worries, I shall rely on the residualist account of the composition of forces defended in Massin (forthcoming a).

2. *Basic actions.* The force-based account presupposes that *forces can be exerted intentionally*, so as to bring about motions. The Davidsonian orthodoxy has it however that our most basic physical actions are bodily movements. Can exercises of forces really be intentional? Without prejudging this complex issue (see e.g. Hornsby, 1980: 20-32), it might be noted that at least one kind of fairly basic actions *seem* to consist in intentional exercises of forces, namely *pushing* and *pulling*. Such actions, as it appears, can be performed successfully even if neither motions, nor changes in motion occur.

3. *Mental forces.* How does the force-based account generalize to *non-physical efforts* —mental efforts such as efforts of will, efforts of attention? One way to generalise the model is to introduce *mental forces*, so as to equate mental efforts to the exercise of mental forces against some other mental resistive-force. The move is not unprecedented: the idea that there are mental forces that compose with each other has been advanced by Wundt (1897: 186); Sidgwick (1981: 112); Lewin (1938) or Freud (1910 ; 1915, see McLaughlin,1987 for a useful discussion). Economists have also proposed to understand the relation between utilities or preferences in terms of composition of forces (Jevons, 1967: 133; Fisher, 2006: Ch. 3). More generally, force-related expressions are quite common within both ordinary and scientific psychology: “mental muscle”, “strength of will”, “will-power”, “spring of action”, “resisting temptations”, “being torn between desires”, “attraction and repulsion” are recurring psychological idioms. This suggests that the idea of overcoming internal resistances is no less intuitive than the one of overcoming physical ones. The key issue however, is whether that mechanical idiom, as applied to the mind, should be taken *to the letter* or rather considered *metaphorical*, lacking real psychological counterparts (similarly, resource-based accounts of effort have to introduce mental surrogates to physical energy — such as “self control”— to explain mental efforts).

4. *Difficulty.* A fourth problem raised by force-based accounts pertains to the distinction between the (objective) intensity of efforts, and their (subjective) difficulty. Lifting a given weight at a given speed requires the exertion of the same force, whoever the agents are: the *intensity* of their efforts will then be the same, but lifting the weight might still be more *difficult* for some agents than for other (see Naccache & al., 2003; Noakes, 2012 for empirical confirmations). How can force-based accounts explain the subjective difficulty of effort? One possibility to be explored relies on an early suggestion by Delboeuf (1881), to the effect that mental and physical efforts are closely intermingled. Making a physical effort (to overcome, say, gravitation), usually requires making a second-order mental effort (to overcome aversion to first-order physical effort). Perhaps the difficulty of a physical effort —by contrast to its intensity— corresponds to the intensity of the second-order mental effort required to undertake it.

Sub-project B: the Values of Efforts

The second sub-project purports to elucidate the values of effort. Two main kind of final (i.e. non-instrumental) values are common ascribed to efforts: *hedonic* and *moral* values. What exactly are these values of efforts, and how do they relate to the nature of efforts?

B.1 The hedonic values of Effort

“Efforts are from their very nature more or less disagreeable”, writes Hearn (1864). Ortega y Gasset (1965) concurs: “Effort is only effort when it begins to hurt”. Four questions arises with respect to effort’s unpleasantness or hedonic disvalue:

1. What is the relation between the unpleasantness and the *difficulty* of effort? One view is that the former *grounds* the later. A distinct view is that the difficulty of effort just *is* a form of unpleasantness.

2. What is the *adaptive value* of effort's unpleasantness? In evolutionary psychology, pleasantness typically accrues to adaptive behaviours (sexual activity, eating...) so as to reinforce them, while unpleasantness accrues to states or behaviours that are unfit (bodily damage, hunger...). Why then are efforts unpleasant since they seem adaptively valuable? Two lines of answer are that the unpleasantness of effort informs us about our energy expenditures (Preston & Wegner, 2009) and that it signals the need to stop or to reassess the on-going activity against alternative possibilities (Hockey, 2011; van der Linden, 2011; Inzlicht & al. 2014; Kurzban, 2016).

3. In spite of their unpleasantness, efforts are sometimes enjoyed and one might have a *taste for effort* (Waterman, 2005). How are pleasures taken in efforts to be understood? A first hypothesis is that effort engenders pride about one's self-mastery or perseverance. According to another hypothesis I would like to explore, pleasures taken in efforts are typically less complacent and reflexive: they rather belong to the category of *pleasures in activity*. We enjoy *doing* certain things: *pursuing* certain ends by contrast to *attaining* them (Bain 1875; Shand, 1920; Sidgwick, 1907; Allen, 1930; Bühler, 1928; Ryle, 1954; Mulligan, 1988; Johansson, 2001). If all activities are effortful and if all efforts are unpleasant, then every pleasure in activity is a kind of *mixed feelings* (Massin, 2011c; 2014b). A possible explanation of the paradoxical connection between the enjoyment and the unpleasantness of effort goes as follows: too easy games are boring; unchallenging activities quickly become unpleasant. Up to a certain limit (above which despondency takes up, see Brandstätter & al. 2013), the more we encounter resistance or adversity, the more we enjoy games. On that hypothesis, the ground of the effort's pleasantness is not such much their moral worth than their difficulty, insofar as it is a condition for activities to be enjoyable.

B.2 The moral values of effort

Effort has often been considered as being of *moral* value and as a main ground of moral desert (2.1). This proposal however raises several problems on closer scrutiny:

1. *Innateness*. One common ground for scepticism with respect to the moral value of effort is that to the extent that the ability to make efforts is itself undeserved — e.g. because some people are borne more prone to effort than others— efforts cannot ground desert (Rawls, 1971, p. 104; see Sher, 1979 for one possible answer).

2. *Malicious efforts*. Efforts to attain intrinsically bad goals make their agents more blameworthy, not praiseworthy. This is reflected in the criminalization of *attempts* within criminal law (Duff, 1996; Yaffe, 2010). But if effortfulness is a ground of moral worth, shouldn't strivings for the bad instead be *less* blameworthy than lazy pursuits of the bad? Such a puzzle presents important similarity with a famous problem raised by malicious pleasures, the problem of *organic unities*: if pleasure is intrinsically good, how come that taking pleasure in a wrong action makes one even worse, not better? If the analogy indeed holds, one might expect to apply to malicious efforts the same kind of solutions that have been applied to malicious pleasures. The important literature on organic unities should therefore prove helpful to tackle the issue of malicious efforts (see Massin, 2011a, 216-220 for references).

3. *Pointless efforts*. Even assuming that the goal pursued is good —or just not bad— pursuing a good goal strenuously is not yet necessarily better than pursuing it effortlessly: when the goal can be reached without effort, effort is not praiseworthy but irrational (Becker & al. 2015). Weber (2002, chap. II) notices that even the most ascetic forms of protestant puritanism do not value pointless or dispensable efforts. The moral valuation of effort should not conflict with the principle of least effort.

4. *The value of effortlessness*. Even rational efforts directed at valuable goals might not be valuable. A recurrent idea within Aristotelian virtue ethics, but also within Stoic ethics (Campbell, 1985) is that accomplishing deeds effortlessly makes one even more praiseworthy (Sorensen, 2010; Douglas, 2014). Likewise in political philosophy, obstacles to one's will are claimed to restrict

one's *negative liberty*: the capacity to act without encountering resistance —hence without effort—is also seen as a *political* ideal. How are these ideas to be reconciled with the idea that effort is of intrinsic moral worth?

5. *Pharisaic striving after virtue*. Striving after *moral* goals has been claimed to be self-defeating (Scheler, 1973a; Hartmann, 1932: vol. 2, 345), quite in the same way in which striving after happiness is held to undermine happiness (Sidgwick, 1981: 48; Scheler, 1973a: 253 ; Broad, 1959: 192; Shand, 1920: 517, Feinberg, 2007). The idea is that for our deeds to be *morally* valuable, they have to aim at the realization of *non-moral* values (such as hedonic, esthetical or epistemic ones). Efforts directed at the realization of *moral* values are pharisaic, not just because they are self-complacent, but more fundamentally because they mistakenly pursue moral goodness for its own sake.

The idea that the more effortful and action is, the more virtuous it is, then faces serious challenges. Two refined account of the moral worth of efforts will be assessed in more details.

(i) According to an account that might be dubbed “*ascetic*”, efforts accrue moral value because they manifest one’s self-control. One potential problem with this kind of proposal various self-inflections pain may also display one’s self-control without being morally valuable for that reason (Bradford, 2014:107).

(ii) Nietzsche paid particular attention to two aforementioned paradoxes about effort: that *effort’s pleasantness depends on their difficulty* (see B.1) and that *the virtue and freedom of the striving agent depends on his encountering resistances* (Nietzsche, 1968; Reginster, 2007; Dries, 2015). On a broadly *Nietzschean* account, the moral worth of effort consists in some *agonistic* value. The corresponding virtue is not that of self-control, but rather that of *perseverance* or *tenacity*. In the same way that the pleasure of pursuit are of higher hedonic value than then pleasure of attainment, the value that accrues to the striving against some resistance is held to be morally higher than the value of the achievement to have overcome it.

Wrapping up, three main hypotheses will be scrutinized more closely, which, on top of their respective intrinsic plausibility, fit well with each other. The first accounts for the *nature efforts* in terms of voluntary exertion of forces against some resistive force; the second accounts for the *hedonic value* of efforts in term of the pleasure taken in challenging activity; the third accounts for the *moral worth* of effort in terms of the value of tenacious striving against adversity. Both the hedonic and the moral values of effort, so understood, are grounded in the opposition between active and passive forces that lie at the heart of effort.

Method and Scope

In spite of the lack of an explicit definition of effort, we have no problem deciding whether such and such episode is an effort or not. In ordinary thinking as in the sciences, claims about the causes, roles or values of efforts rely on some *implicit grasp of the nature of effort*, which proves practically and scientifically fruitful. This tacit pre-theoretical understanding of effort shall constitute the starting point of the project. Rather than building a definition of effort out of the blue, the methodology will be to try to *make explicit the implicit definitional assumptions about effort made across ordinary psychology, ordinary ethics, philosophy and sciences*. This methodological approach is a species of *conceptual analysis*, standard in philosophy arguably since Plato. It shall however be original in three respects.

First, conceptual analysis typically targets the assumptions implicit to our *ordinary* ways of acting and thinking. This project departs from such an armchair approach. Its working assumption is that a common tacit conception of efforts cuts across ordinary *and scientific thinking*. To uncover it, conceptual analysis should also be applied to scientific materials. This assumption may prove wrong. The wide varieties of explanatory roles ascribed to the concept of effort (2.1.1) may arise legitimate suspicion about the unity of such an all-purpose *explanans*. A possibility, therefore, is that instead of a single generic concept of effort, only disparate uses of the term “effort” referring to no common natural kind are to be found. As has been claimed about the concept of pain or of mental state, the concept of effort may then be of no scientific relevance. Such a sceptical conclusion is not to be excluded *ex ante* and would in itself constitute a very substantive result. For the unity of the concept of effort is widely taken for granted and hardly ever questioned. In ethics, for instance, all species of efforts are considered to be equal candidates when it comes to grounding desert.

In economics as in behavioural sciences, further, efforts are assumed to belong to a same natural kind in that their costs can be compared to each other in the process of decision making (McFarland, D.J. and Sibly, R.M. 1975; McNamara & Houston, 1986; Spurrett, 2014). An intermediate possibility is that in between an essentialist analysis in terms of necessary and sufficient conditions and a more eliminativist account, some family resemblance account can be developed. This again, would constitute a significant result.

The methodological approach retained here will display originality, second, in tackling the concept of effort from both a *descriptive* and a *normative* perspective. This is reflected in the scientific areas taken into account in the project, which includes not only psychology —as is by now common in philosophy— but also *economics* and *law*. There are two ways for sciences to buttress the conceptual analysis of effort. First, their *empirical* results put constraints on a priori claims about efforts, and often suggest neglected conceptual distinctions. Second, as noted above, such disciplines also make *a priori* claims and assumptions about efforts. As a result conceptual analysis of effort is not only to be tested against the empirical results of sciences, it also has also to take their conceptual commitments into account.

Third, it shall be assumed that significant insights about effort can be gathered from history of philosophy, psychology, sociology or economics. Although the goal of this project is not to make the history effort research, a general account of effort shall accommodate the main insights of the past authors having studied it (Destutt de Tracy, Adam Smith, Maine de Biran, James, Dilthey, Peirce, Scheler, Baldwin, Stout... to name but a few).

The scope of that project is however not unrestricted. On the philosophical side, one important issue that shall be left unaddressed is that of mental causation. One reason for this is that this problem —a field of research of its own— arises largely independently of the kinds of the conations under consideration: (intentions, desires, volitions, decision, choices...or efforts). Relatedly, on the scientific side, and despite significant advances in neurosciences of effort (see 2.1.4, i), the question of the neural basis of effort shall not be directly considered either.

Summing up, this project intends to elucidate the nature and value of effort through *historically and scientifically informed conceptual analysis*. In order to provide such an unified account of effort —or to establish its impossibility— it shall proceed by gathering the key features ascribed to effort, *explicitly or implicitly, empirically or apriorily* from the various normative, scientific and historical fields in which the concept occurs.

Dissertations and team

The project involves in its core team the main applicant plus two Ph.D students, each working on some specific issue connected respectively to sub-projects A and B.

Possible topics of dissertation for *sub-project A* are *the relations between trying and other conations; the relation between effort, abilities and incapacities; the phenomenology of obstacles and resistance; effort and self-world dualism; difficulty and ease; effort and strength of will*. Possible topics of dissertation for the PhD student attached to *sub-project B* include *pleasure in effortful activity; the place of effort in economic concepts such as value, wealth, exchanges, costs; the hypothesis that trying is the fundamental bearer of moral value/ the locus of moral and penal responsibility; the normative status of obstacles and the concept of negative liberty; computations of various effort costs and the common currency hypothesis*.

Both doctoral positions shall be advertised broadly and much in advance and the best applicants will be auditioned. Applicants for sub-project A shall have completed a master in metaphysics, philosophy of action, philosophy of mind or philosophy of language. Additional competence in physics, psychology, logic or history of psychology shall be considered positively. Applicants for sub-project B shall have a master in practical philosophy (value theory, moral philosophy, political philosophy, philosophy of law). Additional competence in economics, law and/or deontic logic may be an advantage.

Setting of the project

The Zürich's Institute of Philosophy combines strengths in three areas—theoretical philosophy, history of philosophy and practical philosophy—in a way that is unique in Switzerland. Given that the present project is meant to be pursued in a historically informed way and has both a theoretical and practical side, the Institute is the ideal host for that project.

Sub-project A directly connects with theory of action, an area in which Pr. Glock is doing an increasing amount of work. It also tightly connects with the philosophy of motivation, a topic on which exchanges with Pr. Saporiti about modern theories of the will be fruitful.

With respect to sub-project B, Pr. Halbig's work on axiology will help elucidate the connection between the normative and descriptive features of effort. Collaboration with Pr. Cheneval shall help substantially when exploring the connection between the value of effort and the labour theories of economic value and ownership. Finally, the question of the value of effort tightly connects with general moral issues, such as the nature of moral worth, virtues and desert, topics on which the inputs of Pr. Schaber could prove invaluable.

Outside the Philosophy Institute, the work Pr. V. Brandstätter and his team on the psychology of effort and action crises shall constitute precious inputs to sub-project A. Besides, Pr. E. Fehr and his team on behavioral economics have declared strong interest in collaborating on sub-project B.

2.4. Schedule and milestones

As a consequence of their interdependency, the two sub-projects will be conducted simultaneously. The organisational backbone of the project will be the weekly seminar. Sessions will be of three types (i) Discussion of an external paper (ii) Discussion of writings from project members. (iii) Conference given by an external speaker. The aim is to have roughly 5 talks by semester, and at least 6 sessions discussing internally produced works (each project members shall propose two texts by semester). One chief priority of the seminar is to *maximize the writing efficiency* of the participants. Hence discussion of published papers by non-members shall be the exception.

One of the main outputs of the project will be a *monograph on the nature and value of efforts*, whose structure shall broadly match that of the present project, and whose elaboration shall begin from the start of the project.

Year 1

(i) The weekly seminar is launched right from the beginning of the project. The general theme of year 1 for invited conferences are the concepts of *willing and trying*, in both their descriptive and normative dimensions.

(ii) First half of year 1: project members complete the mapping of the researches pertaining to effort, with the aim of spotting the main claims about the nature and value(s) of efforts explicitly or implicitly endorsed in the main research areas making use of the concept.

(iii) By the end of years 1: Ph.D students have precisely defined the subject of their dissertation; have engaged with the relevant literature; and have presented three texts each at the weekly seminar. The project leader has (a) submitted two papers laying the ground for the rest of the project, one defending the *action-theory of trying*; the other offering an account of *derivative values*, essential to assess to moral and hedonic values of effort; (b) written the two first chapters of the monograph, one mapping the field of the various effort-researches, the other posing the main desiderata that a general account of effort should meet.

Year 2

(i) The general theme of year 2 for invited conferences is the concepts of *prevention, resistance and obstacle*.

(ii) By the end of years 2: Ph.D students have written nearly half of their dissertation. The project leader has (a) submitted two papers, one on force-based approaches of efforts; the other on of pleasure in activity; (b) written two further chapters of the monograph: one mapping the main theories of effort; one on the hedonic value of effort.

(iii) An international conference on “Resistance and Reality” is held around February; the proceedings will be published in some A-journal or with a prestigious editor.

Year 3

(i) The general theme of year 3 for invited conferences will be the concepts of *cost and difficulty*.

(ii) The PhD students are expected to provide a first complete draft of their dissertation at the end of the year.

(iii) By the end of year 3, I plan (a) to have submitted a new paper on the nature of cost and difficulty; to have revised and re-submitted formerly submitted papers, if necessary. (b) to have written two further chapters of the monograph, one on the subjective difficulty of effort; the other of the moral worth of efforts. (c) to have compiled the different papers of the proceedings of the “Resistance and Reality” conference.

(iv) A two-day workshop on the concept on cost and difficulty will be organized during the year.

Year 4

(i) The general theme for the invitation of year 4 could be the concepts of *abilities and incapacities*.

(ii) The writing session of the weekly seminar are all dedicated to re-reading, correcting and improving the dissertations of the Ph.D candidates, that are to be defended at the end of the year.

(iii) By the end of year 4, I will have (a) submitted the complete monograph to some prestigious editors and (b) submitted two new papers, one on the relation between willing, striving and incapacities; the other on the relation between efforts and economic values. (c) published the proceedings of the year 2 conference.

2.5 Relevance and impact

Although used as a key element in the explanations of a wide variety of phenomena, and causally explained in many ways, *what effort consists in* is an issue that has virtually never been investigated for itself. The scientific relevance of the project is therefore high, proportionate to explanatory role played by the concept of effort in various areas of philosophy, psychology, economics and other sciences. It is often regretted that effort-related research is too scattered. The lack of a general definition of effort certainly impedes the integration of the manifold researches on efforts. Success in formulating a general definition will in turn help unifying these various research areas. Failure to find such a definition, on the opposite, would indicate that perhaps nothing is to be regretted, for the different research fields would target in fact distinct *explananda*. The project will then open original and critical perspectives on influential views in philosophy, psychology, or economics. The project will be in a position to fruitfully engage with contemporary research programs, in theoretical and practical philosophy, psychology of motivation or behavioural economics.

Publication of the results. Papers will be submitted to top-tier journals. The proceedings of the “Resistance and Reality” conference and the monograph on the nature and value of efforts will be submitted to some prominent publishing house. These results will also be communicated to academic audiences through regular participation to academic events to which PhD will be encourage to participate from the beginning of the project. Beside, a commented and structured bibliography gathering the various past and present works on effort will be realized during the first semester of the project, as indicated on the schedule: that bibliography will be put online on the website of the project, and will be regularly updated.

Knowledge transfer. I have been very dedicated to introducing philosophical researches to the general public, and shall continue to do so within the present project. A specific webpage addressed to a general audience will be updated monthly, with short texts and short videos summarizing the main advances and remaining challenges. The effort of clarification required by such a task will benefit in return the research-project itself.

Selective Bibliography

- Ackerman, P. L. 2011. 100 years without resting. In: *Cognitive fatigue: Multidisciplinary perspectives on current research and future applications*, ed. P. L. Ackerman, . American Psychological Association, 11–43.
- Adams, F. 1995. Trying. *Journal of Philosophical Research* 20:549-561.
- Akerlof, G. A., & Yellen, J. L. 1990. The fair wage-effort hypothesis and unemployment. *The Quarterly Journal of Economics*, 255-283.
- Applebaum, H. 1992. *The Concept of Work: Ancient, Medieval, and Modern*, State University of New York Press, Albany, N.Y.
- Aronson, E., & Mills, J. 1959. The effect of severity of initiation on liking for a group. *The Journal of Abnormal and Social Psychology*, 59(2), 177.
- Baldamus, W. 1961. *Efficiency and Effort*, Tavistock, London.
- Bannister, R. G. 1956. Muscular effort. *British medical bulletin*, 12(3), 222-225.
- Bastiat, F., 1996, *Economic Harmonies*, trans. W. Hayden Boyers, Irvington-on-Hudson, New York, Foundation for Economic Education.
- Baumeister, R. F., Muraven, M., & Tice, D. M. 2000. Ego depletion: A resource model of volition, self-regulation, and controlled processing. *Social cognition*, 18(2), 130-150.
- Bayne, T. 2011. The sense of agency. In Fiona Macpherson (ed.), *The Senses: Classic and Contemporary Philosophical Perspectives*, Oxford University Press, 355–374.
- Bayne, T. & Pacherie, E. 2007. Narrators and comparators: the architecture of agentive self-awareness, *Synthese* 159: 475-91.
- Becker, D., & van der Pligt, J. (2015). Forcing your luck: Goal-striving behavior in chance situations. *Motivation and Emotion*, 1-9.
- Beebe, H. 2009. Causation and Observation. In Helen Beebe, Christopher Hitchcock & Peter Menzies (eds.), *The Oxford Handbook of Causation*. Oxford: Oxford University Press.
- Bennett, J. 1988. *Events and their Names*. Oxford, Oxford University Press.
- Billetier, J. F. 2002. *Leçons sur Tchouang-tseu*. Editions Allia.
- Blakemore, S.-J., Wolpert, D. M., & Frith, C. D. 2002. Abnormalities in the awareness of action. *Trends in Cognitive Science*, 6(6), 237–242.
- Bradford, G. 2014. *Achievement*. Oxford University Press.
- Brandstätter, V., & Schüler, J. 2013. Action crisis and cost–benefit thinking: A cognitive analysis of a goal-disengagement phase. *Journal of Experimental Social Psychology*, 49, 543-553.
- Brandstätter, V., Herrmann, M., & Schüler, J. 2013. The struggle of giving up personal goals - Affective, physiological, and cognitive consequences of an action crisis. *Personality and Social Psychology Bulletin*, 39(12), 1668-1682.
- Brehm, J. W., & Self, E. A. 1989. The intensity of motivation. *Annual review of psychology*, 40, 109-131.
- Brinkmann, K., Franzen, J., Rossier, C., & Gendolla, G. H. 2014. I don't care about others' approval: Dysphoric individuals show reduced effort mobilization for obtaining a social reward. *Motivation and Emotion*, 38(6), 790-801.
- Broad, C. 1923. *Scientific Thought*, London: Routledge & Kegan Paul.
- Camerer, C. F., & Hogarth, R. M. 1999. The effects of financial incentives in experiments: A review and capital-labor-production framework. *Journal of risk and uncertainty*, 19(1-3), 7-42.
- Campbell, C. 1939. "The Psychology of Effort of Will." *Proceedings of the Aristotelian Society* :49–74.
- Campbell, K. 1985. Self-mastery and Stoic Ethics. *Philosophy*, 60(233), 327-340.
- Carson, Kevin A. 2004. *Studies in Mutualist Political Economy*. Fayetteville, Ark. <http://mutualist.org/id47.html>.
- Charness, G. 2000. Responsibility and effort in an experimental labor market. *Journal of Economic Behavior & Organization*, 42(3), 375-384.

- Clarke, Randolph. 1999. "Free Choice, Effort, and Wanting More." *Philosophical Explorations*, 2: 20–41.
- Coffman, E. J. 2004. On Making an Effort. *Philosophical Papers* 33 (1):11-21.
- Cohn, A., Fehr, E., Herrmann, B., & Schneider, F. (2014). Social comparison and effort provision: evidence from a field experiment. *Journal of the European Economic Association*, 12(4), 877-898.
- Delboeuf, J. 1881. "Le sentiment de l'effort." *Revue Philosophique de la France et de l'Étranger*.
- Demant, J., P.S. Muhle-Karbe, M.T. Lynn, I. Blotenberg, and M. Brass. 2013. "Power to the will : how exerting physical effort boosts the sense of agency." *Cognition* 129 :574–578.
- De Vignemont, F., 2007. "Habeas corpus: The sense of ownership of one's own body." *Mind & Language*, 22(4), 427-449.
- De Vignemont, F. & Massin, O. 2015. Touch. In Mohan Matthen (ed.), *The Oxford Handbook of the Philosophy of Perception*. Oxford University Press.
- Douglas, T. 2014. The Relationship Between Effort and Moral Worth: Three Amendments to Sorensen's Model. *Ethical Theory and Moral Practice* 17 (2):325-334.
- Dries, M. 2015. Freedom, Resistance, Agency. In Peter Kail & Manuel Dries (eds.), *Nietzsche on Mind and Nature*. Oxford University Press 142–162.
- .2013. "The feeling of doing—Nietzsche on agent causation" *Nietzscheforschung*, 20(1), 235-247.
- Duff, A. 1996. *Criminal attempts*. Oxford University Press.
- Duncker, K. 1941. On pleasure, emotion, and striving. *Philosophy and Phenomenological Research*, 1(4), 391-430.
- Fales, E. 1990. Causation and universals. London: Routledge.
- Fehr, E. 2002. "Behavioural science: The economics of impatience." *Nature*, 415(6869), 269-272.
- Feldman, F. 2004. *Pleasure and the Good Life : Concerning the Nature, Varieties, and Plausibility of Hedonism*. Oxford University Press.
- Ferrero, G., 1894. L'inertie mentale et la loi du moindre effort. *Revue Philosophique de la France et de l'Étranger* 37, 169–182.
- Forbes, G. 2006. *Attitude problems*. Oxford: Oxford University Press.
- Forest, D. 2007. "Bain and centralist theories of action control and the consciousness of acting." *philpapers.org*.
- Freud, S. 1910. "The Origin and Development of Psycho-Analysis" in Rickman, J. (ed.) 1937. *A General Selection from the Works of Sigmund Freud* London: Hogarth Press. 3-44.
- .1915 "Instincts and Their Vicissitudes" in, Riviere, J. (ed.) 1959. *Sigmund Freud: Collected Papers* New York: Basic Books., vol. 4 , 60-83.
- Frith, C. 2012. "Explaining delusions of control: The comparator model 20years on". *Consciousness and cognition*, 21(1), 52-54.
- Gailliot, M. T., & Baumeister, R. F. 2007a. The physiology of willpower: Linking blood glucose to self-control. *Personality and Social Psychology Review*, 11, 303–327.
- Gailliot MT, Baumeister RF, DeWall CN, Maner JK, Plant EA, Tice DM, Schmeichel BJ. 2007. Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology*. 92(2):325–36.
- Garnett, A. 1965. *The perceptual process*. University of Wisconsin Press.
- Gasset, J. O. Y. 1956. *The Dehumanization of Art, and Other Writings on Art and Culture*.
- Gendolla, G. H., Wright, R. A., & Richter, M. 2012. Effort Intensity: Some Insights From the Cardiovascular System. *The Oxford handbook of human motivation*.
- Gendolla, G., and Rex A. Wright. 2009. "Effort.", in Sander, D. & Scherer, K.S. *The Oxford Companion to Emotion and the Affective Sciences*. New York: Oxford University Press.134-135.
- Griffith, M. 2007. Freedom and trying: Understanding agent-causal exertions. *Acta Analytica* 22 (1):16-28.
- Glock, H. J., 1996. « Will », in *A Wittgenstein Dictionnary*, Oxford: Blackwell, 386-390.

- Grünbaum, T. 2008. Trying and the arguments from total failure. *Philosophia*, 36(1), 67-86.
- Hacker, P. 2000. *Wittgenstein : Mind and Will*. Wiley-Blackwell.
- Haggard, P. 2005. Conscious intention and motor cognition. *Trends in Cognitive Science*, 9(6): 290-5.
- Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. 2010. "Ego depletion and the strength model of self-control: a meta-analysis". *Psychological bulletin*, 136(4), 495.
- Hamesse, J. 1990. "Le travail chez les auteurs philosophiques du 12e et du 13e siècle" in J. Hamesse and C. Muraille-Samaran (eds) *Le travail au moyen âge: une approche interdisciplinaire*, Institut d'études médiévales de l'Université Catholique de Louvain, Louvain-la-Neuve, 115–127.
- Hartmann, N., 1932. *Ethics*. 3 vols. Trans T. S. Coit. London: George Allen & Unwin Ltd. New York: The Macmillan Company.
- Hearn, W. E. 1864. *Plutology, or, The Theory of the Efforts to Satisfy Human Wants*. Macmillan.
- Hockey, R. 2013. *The psychology of fatigue: Work, effort and control*. Cambridge University Press.
- Holton, R., 1999. "Intention and Weakness of Will," *Journal of Philosophy*, 96: 241-262.
- , 2009. *Willing, Wanting, Waiting*, Oxford: Clarendon Press.
- Hornsby, J. 1980. *Actions*, London, Routledge.
- Hull, C. L. 1943. *Principles of behavior*. New York, NY: Appleton- Century.
- Imai, S., & Richman, C. L. 1991. Is the bizarreness effect a special case of sentence reorganization? *Bulletin of the Psychonomic Society* 29, 429-432.
- Inzlicht, M., & Schmeichel, B. J. 2012. "What is ego depletion? Toward a mechanistic revision of the resource model of self-control". *Perspectives on Psychological Science*, 7(5), 450-463.
- Inzlicht M., Schmeichel B.J., Macrae C.N. 2014. "Why self-control seems □ (but may not be) limited". *Trends in Cognitive Sciences*, 18:127-133
- James, W. 1880. *The feeling of effort*. Anniversary Memoirs of the Boston Society of Natural History.
- . 1890. *The Principles of psychology*, New York : Henry Holt and Co.
- Jammer, M. 1957/1999, *Concepts of Force*, New York: Dover.
- Jeannerod, M. 2002. *La Nature de l'esprit*, Paris, Odile Jacob.
- .1996. *De la physiologie mentale: histoire des relations entre biologie et psychologie*. Odile Jacob.
- . 1983. *Le cerveau-machine : Physiologie de la volonté*. Paris, Fayard.
- Johansson, I. 2001. Species and dimensions of pleasure. *Metaphysica* 2 (2):39-72.
- Kahneman, D. 1973. *Attention and effort* (p. 246). Englewood Cliffs, NJ: Prentice-Hall.
- Kane, R. 1996. *The significance of free will*. Oxford University Press, USA.
- Katz, D. 1935. *The World of Colour*. Kegan Paul.
- . 1989. *The World of Touch*. Hillsdale, NJ : Erlbaum, trad. L.E. Krueger.
- Klatzky, R., and S. Lederman. 1999. "Tactile roughness perception with a rigid link interposed between skin and surface." *Perception and Psycho- physics* 61 :591–607.
- Knoch, Daria, and Ernst Fehr. 2007. "Resisting the power of temptations." *Annals of the New York Academy of Sciences* 1104.1, 123-134.
- Kruger, J., Wirtz, D., Van Boven, L., & Altermatt, T. W. 2004. The effort heuristic. *Journal of Experimental Social Psychology*, 40(1), 91-98.
- Kurniawan, I. T., Guitart-Masip, M., & Dolan, R. J. 2011. Dopamine and effort-based decision making. *Frontiers in neuroscience*, 5.

- Kurzban, R., Duckworth, A., Kable, J. W., & Myers, J. 2013. An opportunity cost model of subjective effort and task performance. *Behavioral and Brain Sciences*, 36(06), 661-679.
- Kurzban, R. 2016. The sense of effort. *Current Opinion in Psychology*, 7, 67-70.
- Lafargue, G., and N. Franck. 2009. "Effort awareness and sense of volition in schizophrenia." *Consciousness and cognition* 18 :277–289.
- Lafargue, G., and A. Sirigu. 2006. "Nature et substratum neurologique du sens de l'effort." *Revue Neurologique* 162 :703–712.
- Lamont, J. 1995. "Problems For Effort-Based Distribution Principles," *Journal of Applied Philosophy*, 12: 215–229.
- Larson, R., den Dikken, M., Ludlow, P., 1997. Intensional Transitive Verbs and Abstract Clausal Complementation. *Linguistic Inquiry*
- Lederman, S.J., S.R. Ganeshan, and R.E. Ellis. 1996. "Effortful touch with minimum movement : Revisited." *Journal of Experimental Psychology : Human Perception and Performance* 22 :851–868.
- Lewes, G. H. Motor-feelings and the muscular sense. *Brain* 1: 14–28, 1879.
- Locke, J. 2008. *An Essay concerning Human Understanding*. Oxford : Oxford University Press.
- . 1988. *Two Treatises of Government*. Cambridge University Press.
- Lorist MM, Boksem MAS, Ridderinkhof KR. Impaired cognitive control and reduced cingulate activity during mental fatigue. *Cognitive Brain Research*. 2005; 24(2):199–205.
- Lotze, H. 1888. *Microcosmos: An essay concerning man and his relation to the world*. Scribner & Welford.
- Ludwig, Kirk A. 1995. "Trying the Impossible". *Journal of Philosophical Research* 20:563-570.
- Maine de Biran, P. 2002. *Essai sur les fondements de la psychologie*, in *Œuvres Complètes*, tome VII-1. Paris, Vrin.
- Marcora, S. 2009. "Perception of effort during exercise is independent of afferent feedback from skeletal muscles, heart, and lungs." *Journal of applied physiology* 106 :2060–2062.
- Marien, H., Aarts, H., & Custers, R. 2014. Reward-driven modulation of adaptive control: How prospective monetary gains interact with unpredictable control demands. *Motivation and Emotion*, 38(6), 771-778.
- Marshall, C. 2015. "Hume versus the vulgar on resistance, nisus, and the impression of power." *Philosophical Studies*, 172(2), 305-319.
- Martin, M.G.F. 1995: Bodily awareness: a sense of ownership. In J. L. Bermúdez, A. Marcel and N. Eilan (eds), *The Body and the Self*. Cambridge, MA: MIT Press.
- Marx, K., & Engels, F. 1867. *Das Kapital: Kritik der politischen Ökonomie* (Vol. 1, No. 1). Meissner.
- Massin, O. 2009. "The Metaphysics of Forces." *Dialectica* 63 :555–589.
- . 2010. *L'Objectivité du Toucher [The Objectivity of the Sense of Touch]*. Ph.D. Dissertation, Aix-Marseille.
- . 2011a. *On Pleasures*. Ph.D. Dissertation, Geneva.
- . 2011b. Résistance et existence. *Etudes de Philosophie*, 9:275-310.
- . 2011c. Joies amères et douces peines. In: Tappolet C, F. Teroni A, Konzelmann-Ziv A, editors. *Les ombres de l'âme, penser les émotions négatives*. Genève: Markus Haller; 2011. p. 55-70.
- . 2011d. Le Mutisme des Sens. In S. Laugier C. Al-Saleh (Eds.), *J.L. Austin et la philosophie du langage ordinaire*, 2011, Hildesheim Zürich New York: Olms, 321-345.
- . 2013. The Intentionality of Pleasures and Other Feelings. In Denis Fisette & Guillaume Fréchette (eds.), *Themes from Brentano*. Rodopi, 307-338.
- . 2014a. Quand Vouloir, c'est Faire [How to Do Things with Wants]. In R. Clot-Goudard (Dir.), *L'Explication de L'Action*. Analyses Contemporaines, *Recherches Sur la Philosophie Et le Langage* N°30, Paris, Vrin 30.
- . 2014b. Pleasure and Its Contraries. *Review of Philosophy and Psychology*, 5(1), 15-40.

- .2014c. L'Etoffe du Sensible. In: Chevalier J-M, Gaultier B, eds. *Connaître, Questions d'épistémologie contemporaine*. Paris: Ithaque; 2014. p. 201-230.
- .2015, *Review of Personal Value*, Toni Rønnow-Rasmussen, Oxford University Press, 2011, *Dialectica*.
- .2016, “Qu'est-ce que la propriété? Une approche Reinachienne”, *Philosophie* (128), dir. D. Pradelle, 74-91.
- .forthcoming *a*, “The Composition of Forces”, *British Journal for the Philosophy of Science*.
- . forthcoming *b* “Bad by Nature, An Axiological Theory of Pain”, *Routledge Handbook of Philosophy of Pain*, ed. J. Corns.
- .forthcoming *c*, “La valeur du plaisir”, in J. Deonna & E. Tieffenbach, *Dictionnaire des Valeurs*, Paris, Ithaque.
- .forthcoming *d*, “Desires, Values and Norms”, in J. Deonna & F. Lauria, *The Nature of Desire*, New York, Oxford University Press.
- .forthcoming *e*, *La Réalité Tangible*, Paris, Ithaque.
- .forthcoming *f*, Brentano on Sensation and Sensory Qualities, *Routledge Handbook on Brentano*, ed. U. Kriegel, Routledge.
- Massin, O. & Hämmerli, M., forthcoming, “Is Purple a Red and Blue Chessboard ? Brentano on Colour Mixtures”, *The Monist* (100), *Brentano*, ed. U. Kriegel.
- Massin O. & Monnoyer J.-M. “Toucher et proprioception, Le corps, milieu tactile.” *Voir* 2003; 26-27:48-73.
- Massin, O. & Tieffenbach, E., forthcoming, “The Metaphysics of Economic Exchanges”, *Journal of Social Ontology*.
- Massin, O. & Mulligan, K., under review, “Happiness and Wealth”
- McArdle, W.D., Katch, F.I. & Katch, V.L. 2009. *Exercise Physiology: Nutrition, Energy and Human Performance*. 7th Edition. Philadelphia: Lippincott Williams & Wilkins.
- McCloskey, D., P. Ebeling, and G. . 1974. “Estimation of weights and tensions and apparent involvement of a “sense of effort”.” *Experimental Neurology* 42 :220–232.
- McLaughlin, R. 1987. “Freudian Forces”. In J. Forge [Ed.] *Measurement, Realism and Objectivity*, Dordrecht : D. Reidel Publishing Companay, 207–233.
- Mele, A. R. 2006. *Free will and luck*. Oxford University Press.
- 1990, « He Wants to Try », *Analysis*, vol. 50, n°4, p. 251-253.
- , 1989. « She Intends to Try », *Philosophical Studies*, vol. 55, n°1, p. 101–106.
- Miller, D., .1996. Two cheers for meritocracy. *Journal of Political Philosophy* 4 (4):277–301.
- Milne, H. 1986. “Desert, effort and equality.” *Journal of applied philosophy* 3 :235–243.
- Morree, H.M., C. Klein, and S.M. Marcora. 2012. “Perception of effort reflects central motor command during movement execution.” *Psychophysiology* 49 :1242–1253.
- Naccache, L., Dehaene, S., Cohen, L., Habert, M-O., Guichart-Gomez., E., Galanaud, D., Willer, J-C. 2003. Effortless control: executive attention and conscious feeling of mental effort are dissociable. *Neuropsychologia* 43: 1318-1328.
- Nicholls, J. G. .1978. “The Development of the Concepts of Effort and Ability, Perception of Academic Attainment, and the Understanding That Difficult Tasks Require More Ability”, *Child Development*, Vol. 49,No.3, 800-814.
- Nietzsche, F. 1968. *The Will to Power*, trans. W. Kaufmann and R. J. Hollingdale. New York: Random House.
- Noakes, T.D. 2012. “Fatigue is a brain-derived emotion that regulates the exercise behavior to ensure the protection of whole body homeostasis.” *Frontiers in physiology* 3.
- Norton, M. I., Mochon, D., & Ariely, D. (2011). “The'IKEA effect': When labor leads to love”. *Harvard Business School Marketing Unit Working Paper*, (11-091).
- Nubar, Y., & Contini, R. 1961. A minimal principle in biomechanics. *The bulletin of mathematical biophysics*, 23(4), 377-391.
- O'Brien, E.J. and Myers, J.L. (1985). When comprehension difficulty improves memory for text. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 11, 12-21.

- O'Shaughnessy, B., 2003. *Consciousness and the World*. New York: Oxford University Press.
- Pacherie, E. 2008. "The phenomenology of action : A conceptual framework." *Cognition* 107 :179–217.
- . 2007. "The sense of control and the sense of agency." *Psyche* 13 :1–30.
- Perry, A. L. 1878. *Elements of Political Economy*, New York, Charles Scribner's Sons.
- Preston , J., & Wegner, D. M. 2009. Elbow grease: The experience of effort in action. In E. Morsella, J. A. Bargh, & P. M. Gollwitzer (Eds.), *Oxford handbook of human action*, 469-486, New York: Oxford University Press.
- Prior, A.N. 1971. *Objects of Thought*. Oxford: Oxford University Press.
- Radulescu, E., Nagai, Y., & Critchley, H. 2014. Mental Effort: Brain and Autonomic Correlates. *Handbook of Biobehavioral Approaches to Self-Regulation*, 237.
- Rawls, J. 1971. *A Theory of Justice*, Cambridge, Massachussets: Harvard University Press.
- Reginster, B. 2007. "The will to power and the ethics of creativity" in *Nietzsche and Morality*, Brian Leiter, Neil Sinhababu (eds.), Oxford 2007, 32-56.
- Ricardo D. 1891. Principles of political economy and taxation. G. Bell and sons.
- Richter, M., & Wright, R. A. 2014. Contemporary perspectives on effort: A special issue. *Motivation and Emotion*, 38(6), 745-747.
- Robinson, M. M., & Morsella, E. 2014. The subjective effort of everyday mental tasks: Attending, assessing, and choosing. *Motivation and Emotion*, 38(6), 832-843.
- Rosenberg, A. 2013. Designing a Successor to the Patent as Second Best Solution to the Problem of Optimum Provision of Good Ideas, in Annabelle Lever ed. *New Frontiers in the Philosophy of Intellectual Property*, Cambridge University Press, 88 – 109.
- Ross, J. 1976. "To Have Have and to Not Have Have", in M. Jazayery, E. Polom, and W, Winter (eds.) *Linguistic and Literary Studies in Honor of Archibald Hill*. Lisse, Holland: de Ridder, 263-270.
- Ruben, D.-H. 2016. A conditional theory of trying. *Philosophical Studies* 173 (1):271-287.
- . 2015. The Physical Action Theory of Trying. *Method* 4 (6).
- . 2013. Trying in Some Way. *Australasian Journal of Philosophy* 91 (4):719-733.
- . forthcoming *b*. The physical action theory of trying. *Method*.
- Ryle, G. 1954. "Pleasure." *Proceedings of the Aristotelian Society* 28 :135–146.
- Sadurski, W. 1985a. "Giving Desert Its Due", Dordrecht, Netherlands : D. Reidel.
- . 1985b. *Giving desert its due : Social justice and legal theory*, vol. 2. Springer Science & Business Media.
- Salamone, J. D., Correa, M., Farrar, A., & Mingote, S. M. (2007). Effort-related functions of nucleus accumbens dopamine and associated forebrain circuits. *Psychopharmacology*, 191(3), 461-482.
- Scerbo, MW. Stress, workload, and boredom in vigilance: A problem and an answer. In: Hancock, PA.; Desmond, PA., editors. *Stress, workload, and fatigue*. Lawrence Erlbaum; 2001. p. 267-78. [aRK]
- Scheler, M. 1973a. *Formalism in Ethics and Non-Formal Ethics of Value*. Evanston : Northwestern University Press, trad. M. Frings, R.L. Funk.
- Schmid, H. B. 2011. Feeling Up to It—The Sense of Ability in the Phenomenology of Action. In *Self-Evaluation*, Springer Netherlands, 215-236.
- Spiegelberg, H. 1960. *The phenomenological movement*, 2 vols. *The Hague: Martinus Nijhoff*.
- Schrenk, M. 2014. "Die Erfahrung der Widerständigkeit der Welt als Wahrnehmung kausaler Kraft" in Spann, A. S./ Wehinger, D. (eds.): *Vermögen und Handlung. Der dispositionale Realismus und unser Selbstverständnis als Handelnde*, Münster: Mentis, 23-62.
- Schulthess, D. 2007. "Maine de Biran, interprète et critique de 'Thomas Reid'", dans Elisabetta Arosio et Michel Malherbe (dir.), *Philosophie française et philosophie écossaise, 1750-1850*, Paris, Vrin, 39-51.

- Searle, J. 1983. *Intentionality*. Cambridge: Cambridge University Press.
- Shand, A. 1920. *The Foundations of Character*, London. Macmillan.
- Sher, G. 1979. Effort, Ability, and Personal Desert. *Philosophy & Public Affairs*, 361-376.
- Silvia, P. J., Nusbaum, E. C., Eddington, K. M., Beaty, R. E., & Kwapil, T. R. (2014). Effort deficits and depression: The influence of anhedonic depressive symptoms on cardiac autonomic activity during a mental challenge. *Motivation and emotion*, 38(6), 779-789.
- Smith, A. 1887. *An Inquiry Into the Nature and Causes of the Wealth of Nations*. T. Nelson and Sons.
- Smith, V.L., and J.M. Walker. 1993. "Monetary rewards and decision cost in experimental economics." *Economic Inquiry* 31: 245–261.
- Sorensen, K. 2010. "Effort and moral worth." *Ethical theory and moral practice* 13 :89–109.
- Stout, G. 1931. *Mind and matter*. Cambridge : Cambridge University Press.
- Taylor, R., 1973. *Action and Purpose*, Atlantic Highlands, New-Jersey, Humanities Press.
- Theocarakis, N. J. 2010. Metamorphoses: The Concept of Labour in the History of Political Economy. *The Economic and Labour Relations Review*, 20(2), 7-37.
- Treadway, M. T., Buckholtz, J. W., Cowan, R. L., Woodward, N. D., Li, R., Ansari, M. S., ... & Zald, D. H. 2012. Dopaminergic mechanisms of individual differences in human effort-based decision-making. *The Journal of Neuroscience*, 32(18), 6170-6176.
- Turvey, M.T. 1996. "Dynamic touch." *American Psychologist* 51 :1134–1152.
- Turvey, M.T. & Carello, C. 2011. Obtaining information by dynamic (effortful) touching. *Philosophical transactions of the Royal Society B: Biological sciences*, 366, 3123– 3132.
- Twardowski, K., 1999. *On Actions, Products and Other Topics in Philosophy*, J. Brandl, J. Wolenski & A. Szylewicz (eds.), Rodopi.
- van der Linden, D. 2011. "The urge to stop: The cognitive and biological nature of acute mental fatigue". In: Ackerman, PL., editor. *Cognitive fatigue: Multidisciplinary perspectives on current research and future applications*. American Psychological Association.149-64.
- Vaughn, K. I. 1978. John Locke and the labor theory of value. *Journal of Libertarian Studies*, 2(4), 311-326.
- Waismann, F. 1994. "Will and motive." In *Ethics and the will : essays*. Kluwer Academic Pub, trad. H. Kaal. 53–136
- Wagman, J. B., & Carello, C. 2003. Haptically creating affordances: The user-tool interface. *Journal of Experimental Psychology: Applied*, 9(3), 175.
- Weber, M. 2002. *The Protestant Ethic and the Spirit of Capitalism: and other writings*. Penguin.
- Warm, JS.; Matthews, G.; Finomore, VS, Jr. Vigilance, workload, and stress. In: Hancock, PA.; Szalma, J., editors. *Performance under stress*. Ashgate; 2008. p. 115-41.
- Westbrook, A., & Braver, T. S. 2015. Cognitive effort: A neuroeconomic approach. *Cognitive, Affective, & Behavioral Neuroscience*, 15(2), 395-415.
- Wright, R. A. 1996. Brehm's theory of motivation as a model of effort and cardiovascular response in Gollwitzer, Peter M. (Ed); Bargh, John A. (Ed), 1996. *The psychology of action: Linking cognition and motivation to behavior*, New York, NY, US: Guilford Press, 424-453.
- Yaffe, Gideon. 2010. *Attempts: In the Philosophy of Action and the Criminal Law*. Oxford, Oxford University Press.
- Yamamoto S. and Kitazawa S. 2001b. Sensation at the tips of invisible tool. *Nature Neuroscience* 4:979-980.
- Walker, N., Jones, J.P., and Mar, H.H. 1983. Encoding processes and the recall of text. *Memory and Cognition* 11(3), 275-282.
- Zipf, G. K. 1949. *Human behavior and the principle of least effort*. Oxford: Addison-Wesley Press.