

# The rationality of belief change and the unexpected effects of a conflict of values

Romy Sauvayre

► **To cite this version:**

Romy Sauvayre. The rationality of belief change and the unexpected effects of a conflict of values. Rationality and Society, SAGE Publications, 2017, 29 (3), pp.298 - 321. 10.1177/1043463117717231 . hal-01638099

**HAL Id: hal-01638099**

**<https://hal.archives-ouvertes.fr/hal-01638099>**

Submitted on 19 Nov 2017

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# The rationality of belief change and the unexpected effects of a conflict of values

**Romy Sauvayre**

Université Clermont Auvergne, France

## Abstract

This paper is based on a question that is already present in the work of Festinger *et al* (1956): why is the unequivocal disproof of a given belief an insufficient reason for abandoning that belief? We will first outline the cognitive dissonance theory (Festinger, 1957) and then discuss how, in a seemingly counterintuitive way, beliefs that are contradicted by facts—that is, factual contradictions—lead only to minimal belief changes, whereas beliefs that are in contradiction with some fundamental value held by an individual—that is, axiological contradictions—represent a challenge to the individual's entire belief system and may lead to disaffiliation. The objective of this paper is to propose an alternative explanatory hypothesis to that of Festinger—which is now disputed—and thus provide new answers to help understand the process by which beliefs are abandoned. This paper has epistemological ambitions insofar as it aims to demonstrate that by means of a paradigm based on reasons (Boudon, 1992) and abduction (Peirce, 1931)—the Boudon-Peirce Paradigm—it is possible to propose an alternative, explanatory hypothesis to that of Festinger's, and to provide new answers to facilitate understanding the process of abandonment of beliefs. This comprehensive paradigm has allowed the discovery that conflicts of values—axiological contradictions—can cause disaffiliation.

## Key Words

Belief change, rationality, value, cognitive dissonance, contradiction

## Corresponding author:

Romy Sauvayre, Université Clermont Auvergne, CNRS, LAPSCO, F-63000 Clermont-Ferrand, France.

Email: romy.sauvayre@uca.fr

When a belief denies common sense—by being, for instance, diametrically opposed to general knowledge or to scientific theory—it is often branded irrational. It can indeed be surprising to hear that dew collected from rose petals is a panacea for all ills, that the laying-on of hands miraculously heals cancer and other incurable diseases, that God is the representative of an advanced alien civilization that has developed power over the afterlife, or that the world will end on December 21<sup>st</sup> 2012. However, it is all the more surprising—and seems all the more irrational—when such beliefs are maintained in the face of clear factual evidence against them. We can ask why, for instance, the failure of a prophecy (Festinger *et al.*, 1956) is an insufficient reason for its followers to abandon their beliefs and disengage

from the movement with which they are affiliated. Can it be that these cult followers are indeed so irrational that they continue to believe even when all the evidence is stacked against them?

In order to clarify these issues, we propose to establish a more exact description of the effects of “ordinary contradictions” on belief dynamics by studying the doubts that arise on the one hand from a “factual contradiction” and, on the other, from an “axiological contradiction”. After a brief presentation of the epistemological bases of our approach and the methods used in our research, we will describe these two kinds of contradiction and compare our findings to those of Festinger and his collaborators (1956). The main intent is to present an epistemological reflection on the value of a rationalist paradigm (the Boudon-Peirce Paradigm) based on reasons (Boudon, 1992) and abduction (Peirce, 1931), to propose an alternative, explanatory hypothesis to that of Festinger’s, and to provide new answers to facilitate understanding the process of abandonment of beliefs.

## **Cognitive rationality, “ordinary contradiction” and “reasoning assignment”**

### Assumption of rationality and good reasons

We will endeavor to understand belief dynamics by reference to a comprehensive model based on the assumption that individuals act rationally. According to the *cognitive rationality* model proposed by Raymond Boudon (1992: 22), any social phenomenon is the result of the actions, beliefs, and behavior of individual agents. This requires that the researcher should bring to the fore the “individual causes” of the process and “understand the reasons why social individuals do what they do or believe what they believe” (Boudon, 1992: 27). Thus, the assumption of rationality does not imply that they are motivated by strong rationality, but rather acknowledges that the *sense* that an individual ascribes to his actions or beliefs is determined by and consistent with *reasons* (Boudon, 2003: 52) that are not necessarily “objectively valid.” (Boudon, 1986: V). This results in a broader, more flexible understanding of rationality as “cognitive rationality”.

While Boudon dealt extensively with descriptive beliefs in his work—that is, beliefs that are based on facts that can be clearly characterized as “true” or “false” he also sought to apply the comprehensive method to “normative” beliefs and “axiological” beliefs.” (Boudon, 1986: VI)<sup>1</sup> In this paper, we will therefore endeavor to apply the assumption of cognitive rationality to the study of normative and axiological belief dynamics.

### A specific population: “firm believers”

We chose firm believers as our population as they present several important characteristics that facilitate the study of belief dynamics. They tend to have unconditional faith in beliefs that are diametrically opposed to the normative beliefs prevalent in their more general social environment, and their day-to-day lives and thoughts are entirely centered on these beliefs and on the associated rules and rituals. Thus, they belong to a “cognitive context” (Boudon, 2003: 58) that is characterized by particularism, and become alienated from the general and scientific knowledge commonly accepted by those around them. Furthermore, their descriptive, normative, and axiological beliefs are based on what they hold to be an absolute truth. The boundary between belief and knowledge is therefore dissolved,

and they live in an environment that is determined, deterministic, and so full of certainty that doubt is no longer permitted.

This radicalism facilitates observation of belief mechanisms, as they are more prominent in such populations and the effects of denial, contradiction, and disengagement are therefore more easily noted. Factors intervening in the abandonment of beliefs are more directly apparent and do not require the kinds of experimental condition commonly employed in the domain of social psychology. Moreover, this population has the same characteristics as that studied by Festinger, Riecken and Schachter in *When prophecy fails* (1956), thus making it relatively easy to compare their observations and explanations with those generated by our research. Finally, and in order to clarify the belief mechanisms that come into play in the passage from affiliation to disaffiliation, our research is based on autobiographical interviews with firm believers who have experienced disaffiliation on one or more occasions.

We interviewed 48 people and collected 312 hours of recordings. The mean interview duration was 6 ½ hours per person. To add to the data generated by the interviews, we also carried out some “doubt assessments,” in which the sequence of the follower’s thoughts that led to doubts was reconstructed. Each doubt was then studied further in order to ascertain the reasons for it and to evaluate its intensity, the intensity of adherence to the contradicted belief before and after this doubt first arose, and finally the intensity of the collapse of the follower’s belief system. From these “doubt assessments,” 243 doubts were evaluated using more than 700 numerical scale scores (from “zero” to “ten”) and more than 200 qualitative scale scores (from “not at all” to “totally”) that were obtained from 39 former followers in our sample. The interviews were exploited both qualitatively and quantitatively. This allowed modeling using factors of affiliation and disaffiliation that have been identified in other publications. Statistical methods appropriate to small samples were applied to the data.

The 48 former followers in our sample were drawn from Francophone Europe (France, Belgium, Switzerland, and Luxembourg). 58% were women and 42% were men. Ages ranged from 15 to 77 years, with a median age of 47. As far as education is concerned, 51% had been through further education: 2% were without qualifications; 19% were at junior high or high school level; 28% were high school graduates; 37% were at graduate level; and 14% were at postgraduate level. They belonged to 40 cults with different principally affiliations: Christian (40%), Buddhist (18%), Philosophical (15%), Spiritist (8%), Personal development (10%), Healer (5%), UFO religion (5%). They had belonged to one or more movements for periods ranging from 15 days to 37 years, with a median adherence of 8 years. Given the strong hierarchical structure of such movements, 60.4% of believers were at a lower level, 31.3% had mid-level responsibilities, and 8.3% were at strategic level.

Given the large quantity of data in hand, and in order to facilitate understanding of the concepts of abduction, factual contradiction, and axiological contradiction, we chose to take 2 testimonies out of the 48 to allow the reader better to identify the details, the effects, and the mechanisms in play. The general experience of these followers conforms to that of the others, but the account of their mental processes is so detailed that it greatly facilitates analysis

## Doubts and contradictions

The path of the firm believer is marked by doubts from the time of his affiliation right through to his disaffiliation. Here; we will deal in particular with the doubts that arise from the manifestation of a contradiction. To this end, we first need to define the concept of contradiction and subsequently consider its effect on beliefs. We shall therefore attribute a broad sense to the concept by referring to it as an “ordinary contradiction.”<sup>2</sup> The concept

covers all the kinds of contradiction that can arise in the mind of an ordinary person, from the opposition of two contradictory elements to the Aristotelian logical contradiction.

As we remarked above, firm believers live in a particular “cognitive context”, and their beliefs provide them with absolute truth and certainty. The followers’ sets of beliefs includes a large number of conditional beliefs underpinned by deterministic causal relationships in which the antecedent and its consequent are closely associated: “If I pray more, I am certain to be cured.” “If I reach level X, I will gain greater powers.” “If I become a better person, I will change the world.” When applied to beliefs, such conditionality and deterministic causality allows so high a degree of predictability that it leads to expectations that, in the believer's eyes, are no longer likely, but absolutely certain, to come true. There is no longer any room for doubt. However, when an expectation is not satisfied in the anticipated manner, the follower is faced with a strong contradiction. A contradiction arises from an unfulfilled expectation, from an anticipation that is contradicted by individual or collective facts, words, or actions. When a belief is invalidated either by objective comparison to some fact that contradicts it, or by subjective comparison with other seemingly incompatible elements, the resulting contradiction introduces doubt in the follower’s belief system. The invalidated belief is then called into question and the follower generally experiences an injunction to reasoning which pushes him to attempt to explain the unforeseen turn of events. To illustrate this, we will present several examples of contradictions that gave rise to doubts in the belief system of cult followers. Each of these contradictions seriously unsettled the believer, but did not lead to disaffiliation or to the abandonment of their system of beliefs. Two types of contradiction in particular shed light on belief dynamics: “factual contradictions” (or factual denials) and “axiological contradictions” (reflecting a conflict of values).

## **Factual contradiction and factual judgment**

A factual contradiction arises when a belief is in opposition with a factual judgment—that is, with an objective description of the state of the world. Such factual contradictions oppose an event that is objectively true and a belief that is subjectively true<sup>3</sup> in a situation where, following the Aristotelian principle of non-contradiction<sup>4</sup>, it is not possible for both to be true at the same time. A factual contradiction emerges when an expectation in line with a doctrine is not fulfilled. (“Drink this potion, your cancer will easily be cured,” but no remission occurs) or when a prophecy is revealed to be objectively untrue (you were told, “You will give birth to a boy,” but you bring a girl into the world). This type of contradiction is unique as it cannot be challenged<sup>5</sup> and represents an unequivocal opposition to matters of fact.

### **When prophecy fails: irrationality of the follower and cognitive dissonance**

The three American psychosociologists - Festinger, Riecken, and Schachter (1956) - chose to focus entirely on factual contradictions. They studied a small group of UFO enthusiasts who were expecting the end of the world on December 21<sup>st</sup>, 1955. The cataclysm had been predicted by Mrs. Keech, a member of the group who claimed to have received through automatic writing the teachings of Sananda, a protector of the planet Clarion.

Before the advent of the cataclysm aliens would come and rescue the group’s members. However, the aliens did not arrive on the expected date and missed the second expected meeting; furthermore, the end of the world did not come. These three events represented three unequivocal failures of Mrs. Keech’s predictions. The study concluded that the unequivocal

failure of a prediction is not enough to lead to the abandonment of a belief, but rather gives rise to renewed proselytizing fervor, due to a “necessary” social support (*ibid.*:229). On the basis of this study, Festinger developed the theory of cognitive dissonance. Cognitive dissonance is defined as follows: “Two opinions, or beliefs, or items of knowledge are dissonant with each other if they do not fit together – that is, if they are inconsistent or if, considering the particular two items, one does not follow from the other. [...] Dissonance produces discomfort and, correspondingly, pressures will arise to reduce or eliminate the dissonance.” (*ibid.*: 25-26). Nonetheless, even when an individual experiences cognitive dissonance, he may tolerate it in order to avoid denying a belief when “the behavioral commitment to the belief system is so strong that almost any other course of action is preferable” or “the dissonance would be reduced or eliminated if the members of a movement effectively blind themselves to the fact that the prediction has been fulfilled.” (*ibid.*: 27) According to this theory, any such contradiction provokes a strong emotional reaction that compels the individual to change or support the beliefs involved in the dissonance or “to forget or reduce the importance of those cognitions that are in a dissonant relationship” (*ibid.*: 26) with the sole aim of suppressing the unpleasant emotion. These rationalizations<sup>6</sup> are not based on any rational consideration but, as Pareto (1917) explained, are used as a “logical varnish” applied *a posteriori* by an individual to avoid challenging his beliefs. In their work, Festinger and his collaborators sought to explain a seeming mystery: the practical failure of some belief is insufficient to lead to its abandonment, but rather occasions a renewed zeal for proselytizing. They found that the explanatory cause was merely an avoidance strategy to deal with the cognitive and emotional discomfort that would accompany abandonment of the belief. However, once the follower is seen as using rationalizations to conceal evidence and to resist the abandonment of his beliefs, he is by this fact irrational, according to the definition provided by the philosopher Donald Davidson (1991: 23). We are not, therefore, discussing a theory of rational action.

Let us now return to the followers of the UFO group described by Festinger and his collaborators and, more specifically, to the three consecutive factual disproofs that occurred over a four-day period. None of these disproofs gave rise to an abandonment of beliefs, but they did lead to the following rationalizations:

1/ The first prediction concerned the arrival of a spaceship that would supposedly be sent to Earth to rescue the followers on December 17<sup>th</sup> at 4:00 pm. When the aliens failed to show up, the followers rationalized the result by telling themselves that this meeting was only a training exercise for the day of the real rescue.

2/ The second prediction stated that the rescue by the aliens would occur on December 17<sup>th</sup> at 11:30 pm. Members waited in vain until 3:20 am. This was, once again, a training exercise—a rationalization that was actually confirmed by Mrs. Keech, who supposedly received a message from the aliens praising the patience of their followers.

3/ The third prediction announced that the rescue would take place on December 21<sup>st</sup> at midnight. According to their beliefs, and as the foretold cataclysm was set for that very same day, this rendezvous represented their last chance of survival. Once again, the followers waited but saw no aliens. Here, the suggested rationalization was that group members had prayed so much that, by the sole power of their prayers, they had prevented the cataclysm and therefore no longer needed to be rescued from Earth by the aliens. These believers were so convinced that the end of the world was coming that they had abandoned everything in anticipation of their rescue (employment, housing, material goods, etc.). Therefore, according to Festinger, the cognitive discomfort consequent on admitting the invalidity of their beliefs was so great that they could not bring themselves to do so. They therefore made an *a posteriori* rationalization of their beliefs in order to preserve them more effectively.

It is clear that the theory of cognitive dissonance does not give a rational sense to the cognitive process employed by the followers after the failed prophecy. On this basis, it can be seen as a theory of irrational action. Indeed, and as we will see, the reasoning generated by a contradiction is not characterized by a rationalization *a posteriori*, but by a valid logical inference: that is abduction.

According to the philosopher and logician Peirce (1931: 5.171), abduction is a form of logical inference that allows the generation of “explanatory hypotheses”. Abduction is distinct from, and cannot be reduced to, deduction and induction (Chauviré, 2003), and is the only logical process able to facilitate the emergence of new ideas (Peirce, 1931). “Through induction, an idea is generalized from prior observations [...] whereas abduction is much more powerful as it supposes something different from things already observed, and often, something that would be impossible to observe directly” (Dague, 2003: 25-26). This kind of reasoning is often employed when explaining some unforeseen event. A new hypothesis is therefore drawn from the observed facts that allows the unforeseen event to be seen as probable and comprehensible.

Abduction may be described using the following syllogism: (Peirce, 1931: CP 5.189)

“The surprising fact, C, is observed;  
But if A were true, C would be a matter of course,  
Hence, there is reason to suspect that A is true.”

Thus, an abduction consists in adopting a hypothesis that is suggested by the facts (Peirce, 1931) and that allows one to draw reasonable conclusions without direct observation.

## Factual contradiction, beliefs and healing

To illustrate abductive reasoning, and to further describe the mechanisms of belief, we will give the experience of a firm believer who describes how a factual contradiction caused her to doubt her beliefs. Here, we will see that a single event gave rise to several doubts about her belief system and had various effects according to the injunctions to reasoning required to give sense to the apparent contradictions. Laurianne is a member of a healing movement and believes unconditionally that the laying on of hands can cure all ills. Her beliefs are so strong that she follows to the letter the entirety of the movement's precepts and doctrines. These include the assurance that adherence to all the movement's requirements will guarantee good health. If, however, she should contract a disease, the laying on of hands would heal her completely. Medical assistance would be unnecessary, and even harmful, as it would generate the kind of spiritual impurities that cause the disease itself.

However, Laurianne falls ill and, despite her best efforts, her prayers, and her attempts to be healed, her condition worsens. She is then hospitalized. She thereafter learns that, without the medical assistance she has received, she would have lost her life. She is thus faced with two contradictions. The first opposes the belief that the laying on of hands cures all ills to the observation that this practice did not effectively heal her. The second opposes the belief that medical assistance is unnecessary to the fact that it saved her life. These two contradictions, appearing at the same time during her hospitalization, will not affect her beliefs in the same way.

The first contradiction addresses the belief in the effectiveness of the laying on of hands as a universal healing method. To Laurianne's mind, this belief had achieved the status of an incontrovertible general law. Thus, she expected to be healed, as she believed she had been on multiple occasions in the past. Yet, her expectations were proven wrong by the facts. This factual contradiction did not lead to disengagement, as an external observer might expect or as might be predicted by the rules of a deductive logic, but rather gave rise to questions, even to

doubts, that triggered an *injunction to reasoning*. This follower is confronted by an unforeseen and inexplicable event because of the general law of healing implying that “the laying on of hands invariably cures all ills.” Therefore, she uses abductive reasoning in an attempt to understand this unexpected result as the product of some as yet unknown explanatory rule.. She will thus adopt the rule that has the broadest explanatory power. First, she formulates the hypothesis that the laying-on of hands does not actually have any healing power. However, this hypothesis contradicts all of the healing events that she has experienced herself or those she has witnessed in the past. How is it possible to explain these observed healing events if the laying-on of hands does not have any such healing powers? Abandoning the belief would raise more questions than it would resolve, especially as her personal experience, including *subjective evidence*, invalidated the skeptical hypothesis. To overcome this aporia, this difficulty in resolving the problem by herself, Laurianne enlisted the help of her fellow believers to understand the inexplicable failure of her expectations. In answering her questions, they provided another explanatory rule: that the laying on of hands never fails, except when a follower has accumulated too many spiritual impurities. As in the affiliation process, her fellow believers’ affirmations led Laurianne to doubt her own doubts. She therefore decided to put the proposition to the test.

This “profane management of evidence” (Sauvayre, 2012) led to Laurianne recalling a transgression. She remembered that she had not observed one of the rules of the movement and, according to the doctrine, this must have resulted in spiritual impurities. This explained why the laying-on of hands failed to cure her on this occasion. In short, the explanation provided by her fellow believers had greater explanatory power for Laurianne than would the assumption that the practice was ineffective. Accepting the first explanation allowed her to resolve all incomprehension, while accepting the second would have raised questions that seemed incompatible with her experience. From the point of view of applied abductive logic, she no longer had any reasons to deny the healing power of the laying-on of hands, and therefore had excellent reasons to accept the explanation provided by her fellow believers. As Boudon remarks when qualifying the process as “ordinary knowledge”: “One adheres to a theory when one is under the impression that it includes a set of propositions that can be accepted altogether, and when one does not possess an alternative theory that would be so easily acceptable” (Boudon, 2003: 57). Once the follower had discovered within her “cognitive framework” (Sauvayre, 2012)<sup>7</sup> a satisfying and acceptable explanation that was consistent with her “cognitive context” (Boudon, 2003), her doubts could be assuaged without the need for disengagement, as there was no reason for any such outcome.

Thus, it becomes clear that an explanation based on reasons helps us to understand the follower’s thinking rather than taxing her with irrationality for not abandoning the supposedly invalidated belief. The view that the follower merely rationalizes to avoid abandoning her beliefs hinders any *understanding approach* (Weber, 1998). It also discounts the dynamic process of logical reasoning that can lead her from the initial challenge to the preservation, the revision, or the abandonment of her beliefs.

The second contradiction generated by the same event—that is, the follower’s hospitalization—concerns the role of medical assistance. Before her hospitalization, Laurianne was convinced that medical assistance was unnecessary as the asceticism required by the movement’s doctrine sufficed to guarantee good health; furthermore, she believed that, in itself, medical practice produced spiritual impurities. Yet, without the help of a medical team, she would have lost her life. This factual contradiction is in direct opposition to the beliefs she held about medical assistance. An external observer would expect her to question her beliefs about the laying-on of hands and about medical assistance being unnecessary and



generating spiritual impurities, but – how does follower herself react when faced with such factual contradictions?

Given that Laurianne's survival was effectively due to medical treatment, she cannot deny the necessary role of medical assistance, as she has unswerving *subjective evidence* concerning its effectiveness. The reasoning ensuing from this factual contradiction may be represented as follows:

- 1/ Medical assistance is unnecessary (and generates impurities).
- 2/ Nevertheless, my life was saved due to medical assistance.
- 3/ Therefore, medical assistance is not unnecessary (but generates impurities).

The proposition that “my life was saved due to medical assistance” contradicts the belief that medical assistance is unnecessary, but does not contradict the belief that medical assistance generates spiritual impurities. Indeed, medical assistance is necessary, as her life was effectively saved. However, there is no available evidence that can be used to contradict the belief that it generates spiritual impurities. On the contrary, during her hospitalization, many drugs were prescribed, as well as a surgical procedure; both, according to the doctrine, are capable of generating an immeasurable number of impurities. This second belief – that medical assistance generates spiritual impurities – is far more difficult to contradict as there is no available means of providing a factual denial. Nothing can unequivocally prove that medical assistance does not generate spiritual impurities, just as science cannot unequivocally disprove the existence of God.

As before, Laurianne is faced with an unforeseen event, as she was convinced that she would not need medical assistance. The first conclusion she can draw from the syllogism given above is to question the truth of the assertion “medical assistance is unnecessary”. Unlike the first contradiction, no other explanation can outweigh the logical force of this conclusion. She could weaken its logical force by taking it to be an exception to the general rule, as suggested by the cognitive dissonance theory (Festinger, 1957). For example, she could have decided that “medical assistance is necessary on this occasion, but generally it is not.” Yet, in the follower’s context, the explanatory power of this kind of *ad hoc* reasoning is far weaker than is accepting a challenge to her belief. Furthermore, the proposition that medical assistance is necessary is borne out by her experience. It is a fact that medical assistance is necessary because, without it, Laurianne might have lost her life. Thus, she has *experiential evidence* of the effectiveness of medical assistance. The factual contradiction forces her to abandon the belief that medical assistance is unnecessary, but allows her to maintain her belief that medical assistance generates spiritual impurities.

The factual contradiction analyzed above shows that even when beliefs seem to remain static and are not abandoned in the face of adverse events, there is nonetheless or not abandoned even when circumstances dictate otherwise – significant fluctuation in the beliefs and a dynamic process leading to a change of beliefs. However, this change is so minimal that it is imperceptible. The fluctuations in the strength of Laurianne’s affiliation were measured using a “doubt assessment”. Her affiliation dropped to 6/10 from a maximum strength of 10/10 (see Figure 1 below) during the manifestation of the doubt. On accepting her fellow believers’ arguments, Laurianne’s strength of affiliation rose again to 9/10. The small loss reflects her abandonment of the belief that medical assistance is unnecessary.

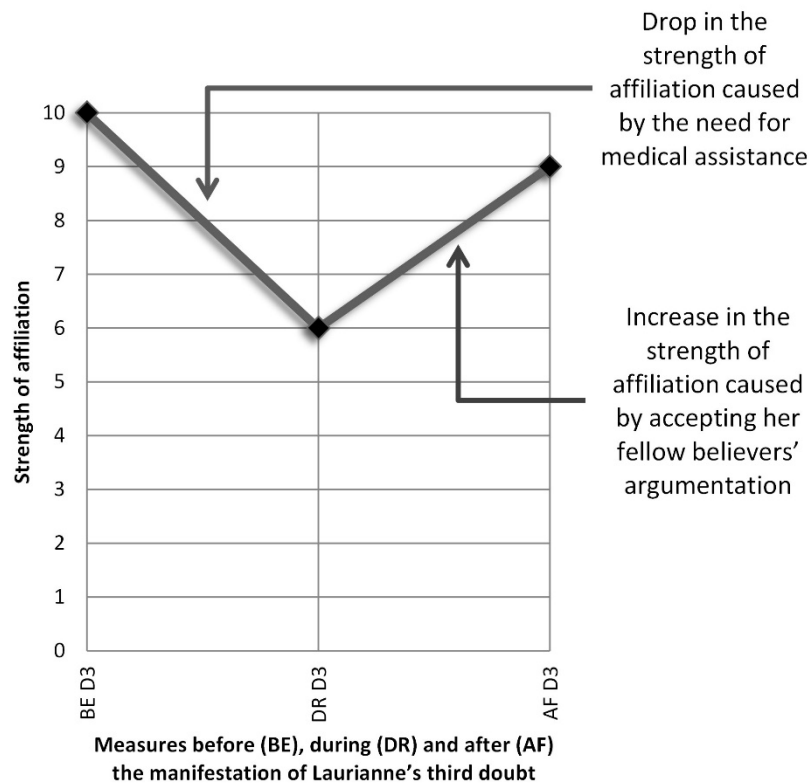


Figure 1 : Fluctuation in the strength of Laurianne's affiliation during the manifestation of the third doubt in her disengagement journey

Analysis of the factual contradiction shows that it has a minor effect on the strength of Laurianne's affiliation, as illustrated in Figure 1. The factual disproof of a belief does not seem to affect the follower, just as Mrs. Keech and her fellow believers did not drop out of the flying saucer movement as soon as they realized that the aliens had not come. Therefore, through a more precise study of the belief mechanisms, it can be seen that a factual contradiction leads to a partial and limited counterintuitive effect rather than the complete disengagement one would expect. It can give rise to a belief change, once there is sufficient subjective evidence for this to happen. Indeed, one might have thought that by contracting a disease, Laurianne gave an unequivocal denial of the effectiveness of the laying-on of hands. However, only a minimal belief change was observed. Festinger, Riecken, and Schachter (1956) would not have noted such a change, and would only have observed "rationalizations" and a "resistance" to belief change.

Thus, the follower does not seek to preserve his beliefs at any cognitive cost, if he has sufficient reason to review them in the light of what he holds to be relevant and reliable evidence. In short, the conclusion that the follower becomes irrational when faced with factual disproof is primarily a distortion introduced by the observer's expectations of how the follower should react, think, or believe—as we have seen, the follower herself is not without a certain contextually-appropriate logic. Beliefs thus seem to enjoy a certain independence or autonomy while belonging to a doxastic whole. Factual disproof can call into question the specific contradicted belief without leading to a complete disengagement, resulting in a partial and limited disengagement within the belief system as a whole.

Here, the limited effect of the doubts consequent on such a contradiction does not in itself allow us to understand the process of disengagement that can lead to disaffiliation from the group and rejection of its doctrine. Therefore, and in order to shed more light on the

mysteries surrounding the process of disengagement, we need to address the second type of contradiction involved in belief dynamics: that is, axiological contradiction.

### **Axiological contradiction and value judgment: the move towards a better world**

An axiological contradiction is born from the opposition between a normative belief concerning what is good, just and beautiful, and a value judgment that contradicts this belief—that is, a subjective assessment of a fact, event, behavior, or speech act (Vanderveken, 1988). A value judgment, therefore, is not limited to a factual judgment, as Livet (2002: 153) remarks after Hume and Kant. The axiological contradiction arising from such an assessment can manifest itself when collective beliefs and values that the follower has internalized enter into contradiction either with a value judgment made about another person (a fellow believer, or the founder of the belief), or with the follower's own individual values. In the latter case, a follower who is, for example, particularly attached to the idea of never harming anyone, may be brought by the requirements of doctrine to endanger the physical integrity of others. Yet, by doing so he enters into conflict with his individual system of beliefs.

The value judgments most likely to generate axiological contradictions generally involve the concept of doing good and related notions, such as the just and the profitable. The values thus challenged are often normative in nature: "He must be loyal, be devoted, etc." As with a factual contradiction, an axiological contradiction will occasion doubt. This, in turn, will lead the follower to question his beliefs and to try to understand and elaborate reasonable explanatory hypotheses to account for some unexpected intrinsic or extrinsic occurrence. The doubt will be accompanied by strong emotions that will reveal the significance of the contradiction.<sup>8</sup>

To clarify the mechanisms involved in axiological contradiction and its impact on belief dynamics, let us consider the experience of a follower who would like to change the world. Louissette belongs to a syncretistic movement bringing together elements of Buddhism, ufology, millenarianism, and healing. She dreams of a better world and hopes to be instrumental in bringing one about. The founder of the movement has provided the plan for this universal betterment. By following his teachings, humanity could be transformed and enjoy peace, goodwill, and love. Attracted by this utopic vision, Louissette joined and obeyed to the letter all of the teachings and requirements of the movement. However, she was told that the journey towards the betterment of the planet and mankind had to begin with her own personal development and that she would still need extensive training to reach a higher level of spirituality.

Fellow believers came together in a spirit of collective co-operation to organize their transport to the place where the training session was to take place. However, while the followers were considering how best to organize the collective voyage to the training course, a disagreement arose between certain members who did not wish to incur the extra expense caused by the detours that would be necessary to pick others up. They disagreed to such an extent that a violent argument broke out. This difference of opinion gave rise to a value judgment by Louissette, followed by her perception of an axiological contradiction.

The conflict is based on one of the movement's central values – "brotherly love" – which she finds hard to reconcile with the lack of cooperation among her fellow believers and the quarrel that ensued. One might expect that, in this trivial situation, just as in a factual contradiction, this axiological contradiction would only relate to her fellow believers and would only affect Louissette's perception of them, without any impact on the whole of her

belief system. However, the underlying cognitive mechanisms of such an axiological contradiction led the follower to challenge much more than her fellow believers' personal values.

To Louissette the behavior of her fellow believers was contrary to the movement's values of love and goodness. Her unconditional adhesion to the teachings led her to transform its principles into laws expressing absolute truths, and she therefore expected her fellow believers to behave in a more loving way and in greater harmony with their "level of spiritual maturity."

Louissette reasoned as follows:

1/ My fellow believers argue and do not display brotherly behavior towards their neighbors.

2/ However, any "mature" individual should be able to control his emotions and act in a loving way towards others.

3/ So, my fellow believers are not spiritually mature.

Here, Louissette establishes a direct link between the idiosyncratic behavior (the quarrel and the lack of "brotherly love") and the kind of behavior required by the doctrine (which she takes as evidence of a fellow believer having reached a higher level of spiritual maturity). This process leads her to draw conclusions that exceed by far the scope and resonance of a factual contradiction.

Furthermore, this firm believer is facing an unforeseen event that she attempts to explain by abductive reasoning, much as if she were dealing with a factual contradiction. Following a process of reasoning that can be represented by the syllogism given above, she infers that her fellow believers are not "mature," although she believes that, in view of their position in the organization, they should be. How does she explain this contradiction? In order to clarify this unforeseen event, she formulates a first explanatory hypothesis, namely that the teachings do not have any effect. But Louissette, who had managed to exercise self-control and keep out of the quarrel, had incontrovertible subjective evidence available from her personal experience that she herself was "mature." The teachings must therefore be effective, as she herself can experience their effects. Thus, she must try to find an alternative explanation.

If the teachings do not have any effect on the group's members, yet Louissette holds subjective evidence of their effectiveness, the only plausible explanation is that "her fellow believers are not spiritually mature yet, but will reach this stage in time", This second hypothesis, which is viewed as rational by the follower herself, is therefore more convincing and more consistent with the cognitive framework she has established by integrating information and beliefs she acquired in the group. Once she accepts this explanation, her doubt disappears and is replaced by renewed certainty about the effectiveness of the teachings. In turn, this strengthens her affiliation with the movement. This fluctuation in her affiliation is shown in Figure 2 below. When the event occurs, the strength of Louissette's affiliation drops from 10/10 to 8/10. It rises again to 10/10 once she is able to explain satisfactorily the axiological contradiction that she faced.

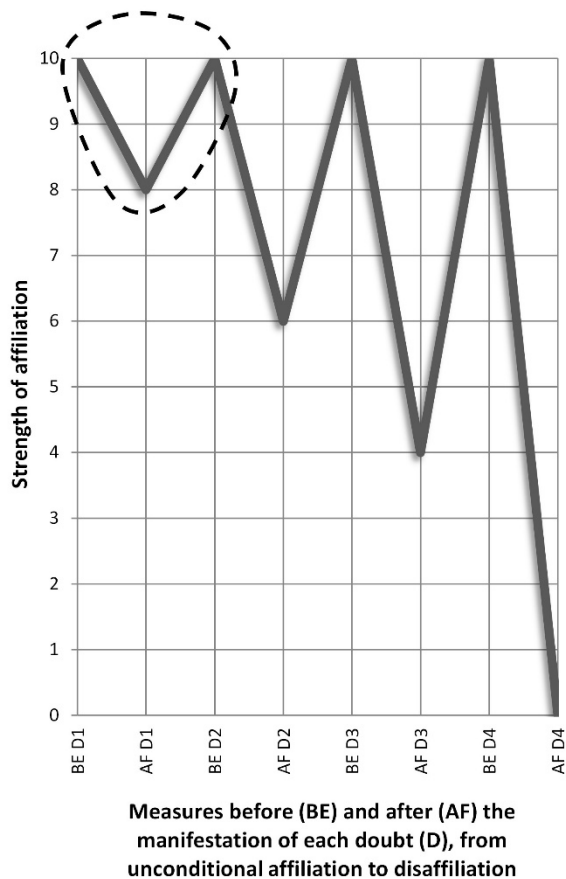


Figure 2: Fluctuation of Louisette’s strength of affiliation during her journey from affiliation to disaffiliation

The impact of the axiological contradiction seems relatively weak as Louisette’s strength of affiliation returns to its maximum without any belief change. Yet, as she seeks a cause in a process initiated by the presence of the axiological contradiction, Louisette will find implicit causal links between the unexpected, idiosyncratic behavior of her fellow believers – their lack of “brotherly love” – and the core of her beliefs and the validity of the doctrine that attracted her to join the movement. The doubt that arose from conflicting values goes beyond the axiological boundaries and spreads to the whole belief system.

A major difference is observed between the factual contradiction perceived by Laurianne and the axiological contradiction experienced by Louisette. The first type of contradiction affects only the contradicted belief, whereas the second type spreads to the core of the belief system to challenge the doctrine itself.

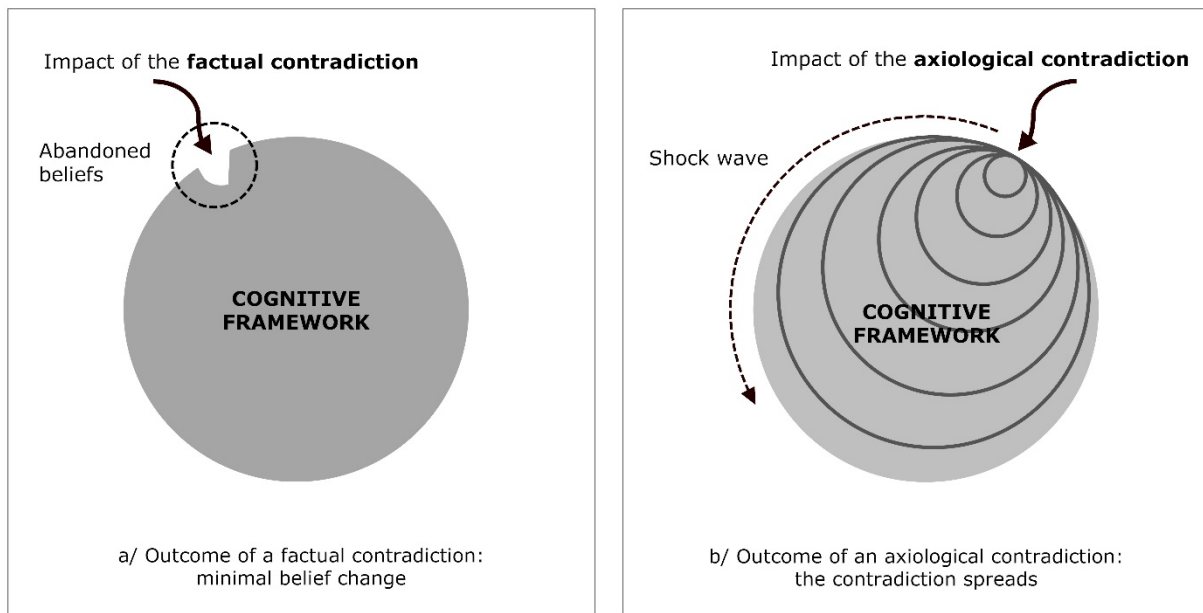


Figure 2: The different effects of factual and axiological contradictions on the follower's cognitive framework.

These dynamic processes may appear to be counterintuitive from the standpoint of an external observer or a researcher. Indeed, according to the views of Festinger and his collaborators, one might expect Laurianne to abandon her beliefs or disassociate herself from the movement once she establishes that the laying on of hands did not heal her. This is because the external observer views the factual contradiction as firm and clear evidence of the chimerical nature of the belief, and he expects the contradiction to spread and reach the core of the belief system. On the contrary, in Louissette's experience, the observer perceives nothing more than a quarrel between individuals leading to nothing more than an inter-individual conflict. He expects the contradiction to be limited to the context of human interaction without having further impact on the follower's beliefs. However, contrary to all expectations, the opposite outcome is observed. The factual contradiction does not spread and reach the whole belief system, but the axiological belief does. Festinger's interpretations are therefore proved wrong, as he assumed that an unequivocal factual denial would lead to disaffiliation from the group and its set of beliefs, whereas it has been shown that its effects are limited to the contradicted belief (Figure 3a). To apply this notion in a more everyday situation: it would be as if you were to decide that your car should be written off and scrapped because the car radio is faulty. Evidently, you would be most unlikely to draw any such conclusion—you would be far more likely to try to understand why the radio is faulty. You would formulate hypotheses to help find out whether the fault is indeed linked to the functioning of the car itself. The follower goes through a similar process, merely using the more unusual knowledge and beliefs that he holds to be absolutely true in his particular representation of reality.

However, mechanism that seems the most mysterious is that underlying an axiological contradiction. A fellow believer's action is perceived to be a transgression of the standards required by the movement and seen by the follower as a clear indicator of the falsity of the doctrine. From seemingly harmless behavior, there arises not only questioning, but also a possible challenge to the entire set of beliefs acquired, as if this event had triggered a *shock wave*, but nonetheless does not lead to a complete revision of the beliefs. (Figure 3b). Yet, neither the minimal belief change that results from a factual contradiction nor the spreading

effects of the axiological contradiction are readily visible to an external observer. This illustrates how difficult it is to study disaffiliation mechanisms. The differences between factual and axiological contradictions reveal an inversion of the external observer's expectations, and this explains why the follower who does not abandon his beliefs in the face of a failed prediction is deemed to be irrational.

## **Factual and axiological contradictions have different effects**

Factual denial has long been recognized as insufficient to lead to the abandonment of a belief, one is still astonished by it. It has long been known that factual evidence against a deeply-held belief is insufficient to lead to the abandonment of that belief; nonetheless, we are still astonished to witness it happen. The process by which beliefs are defended and maintained remains difficult to grasp and even incomprehensible, despite much study. Indeed, why did the members of the UFO group described by Festinger and his collaborators continue to believe in the arrival of the aliens despite having unequivocal evidence that their beliefs were wrong? How can one explain that the follower mentioned above did not abandon her belief that the laying on of hands has a universal healing power?

An external observer studying these issues might expect factual denials to lead to a disengagement followed by disaffiliation from the movement. Yet as we saw above, the follower to a healing movement who nonetheless only survived a serious illness medical intervention still found that her experience was insufficient to cause disengagement. An external observer who witnessed the worsening of her condition would consider the illness to be unquestionable confirmation of the ineffectiveness of her spiritual practices. Consequently, he might reasonably expect her to abandon her beliefs. However, and contrary to the expectations of such a hypothetical observer, the follower continues to adhere to the movement, radicalizes her practice, and becomes even more involved in the spiritual life of the group. On an external viewpoint – such as that adopted by Festinger and his collaborators in *When prophecy fails* – an observer sees only a blind refusal to change based on irrationality and a lack of understanding: although the follower has unequivocal evidence that his belief is wrong, he still refuses to let it go.

However, by examining the process from the follower's viewpoint, with the Boudon-Peirce paradigm, a completely different reality appears in which the firm believer is a rational actor who bases his thinking on entirely valid reasons that can easily be uncovered by a researcher. This more comprehensive paradigm also allows us to identify dynamic processes that are coextensive with the belief. Any attempt to explain belief dynamics must also describe the believer's cognitive context, the conceptual tools available to him, and the different stages of the thought process that has brought him to reaffirm, modify, or abandon his beliefs when faced with a factual or an axiological contradiction. These two kinds of contradiction have effects on the follower's beliefs that are distinct yet equally counterintuitive.

The first type of contradiction, the factual contradiction, leads the follower into a complex process of arbitration in an attempt to explain the cognitive conflict between his belief-based expectations and the facts that prove the beliefs to be wrong. In the wake of this (abductive) thought process, some beliefs are preserved under partial revision and others are abandoned, but affiliation to the group remains unchallenged. This minimal change (Alchourrón *et al.*, 1985) causes the follower to revise only the aspects of the belief that are being challenged, with the whole belief system remaining unchallenged and stable. Although one might have expected the whole belief system to be brought into question, the effects of a

doubt resulting from a factual contradiction remain limited to the aspects of belief that are directly affected by the contradiction.

The second type of contradiction, the axiological contradiction resulting from a conflict of values, reveals an unexpected struggle between an axiological belief and the expression of those values that contradict it. As with a factual contradiction, a doubt arises that leads the follower to question his belief in order, to understand and integrate some unexpected intrinsic or extrinsic event and give it a clear sense. The search for a valid causal explanation we describe above leads the follower to establish causal links between an unforeseen occurrence, the movement's doctrine, and his own beliefs. While one might have expected a minor impact on the belief system, the effects of the doubt resulting from an axiological contradiction are more diffuse and can cross the immediate boundaries of the values brought into question to spread to the core of the belief itself. Indeed, disaffiliation occurs in 71% of cases following an axiological contradiction. It is easy enough for the reader to see how this propagation of doubt from a single occurrence to the belief system as a whole can seem counterintuitive and against all logic, and thus contribute to the general feeling of irrationality that colors our apprehension of such beliefs.

All this being said, to what degree can examination of these two belief mechanisms help to clarify and explain the processes of abandonment of belief and disaffiliation? Although a factual contradiction causes a minimal revision of belief, its limited effects on the belief system make it more difficult to reach a complete understanding of the underlying process. In contrast, the spreading effects of an axiological contradiction, which can reach to the very core of the belief system, help clarify the issues surrounding belief change. Nonetheless, as mentioned in the second example given, this type of contradiction does not lead to disaffiliation. Therefore, we must consider another explanation—the *mnesic trace*. “A mnesic trace concerns the process by which an individual encodes significant events in their autobiographical memory (Brewer, 1986; Conway, Pleydell-Pearce, 2000). This process is highly impacted by emotional responses (Brown and Kulik, 1977; Oishi *et al.*, 2007; Buchanan, 2007; Holland and Kensinger, 2010). When an intense period of doubt follows recognition of a contradiction, the follower experiences so strong a series of emotions that the past event, facts, and mental states (Tulving, 1985) are memorized with the highest degree of accuracy (Talarico, LaBar, and Rubin, 2004). These mechanisms of memory—and particularly the mnesic trace—can help our understanding of the major impact axiological contradiction can have on the follower's beliefs.

Thus, the scope of an axiological contradiction is reinforced by the strong emotion it provokes. As Livet's research shows (2002), emotion can provide powerful motivation to take action. So, due to the sudden irruption of an insurmountable, insoluble, and above all unacceptable conflict in the follower's viewpoint, the resulting emotion is so strong that a pervasive feeling of indignation spreads throughout the follower's cognitive framework. However, as it reaches the associative memory networks (Forgas, 1995; Bower and Forgas, 2000), recalling an emotion can cause the contextual elements of a memory with a similar emotional charge to resurface. In the wake of the manifestation of a contradiction, the immediate doubt disappears, but leaves a mnesic trace in the follower's cognitive framework. As it gave rise to an emotional shock, the contradiction will thus be memorized and stored in the follower's cognitive system. The successive changes in beliefs or representations, even when they are only partial, will be internalized and will form a cumulative supply of emotional disengagement and doubts. The abductive reasoning that results from the numerous contradictions that the follower will encounter as he progresses will thus shape his *cognitive framework*. These imperceptible changes may then condition the nature of the causal explanations the follower will employ in future injunctions to reasoning. The internal process by which the follower *seeks meaning* before accepting the most satisfying explanation also



leaves a mnemonic trace in his doxastic and epistemic systems. The axiological contradiction generates an emotional stimulus that may trigger the resurgence of any doubts and contradictions that the follower had not previously questioned or addressed, or for which he had simply accepted the movement's explanations. He therefore performs a "*back analysis*" of the whole range of doubts that he experienced throughout the period of his initiation. The intense emotion resulting from each doubt becomes the common thread in this introspection. From then on, after an average (i.e., arithmetic mean) number of six occasions of doubt (Sauvayre, 2011), the follower is able to consider his affiliation in a new light. He is able to put the sum of his doubts in perspective, and opens his eyes.

## Conclusion

At first sight, there seems to be no difference between Festinger's theory and this paper which places its emphasis on reasons and abduction. Supporters of Festinger's theory will see in the examples given in this paper a confirmation of the theory of cognitive dissonance, as they have been able to test the theory empirically on numerous occasions. The difference in question is above all epistemological in the French sense as defined by Gaston Bachelard (2004). Bachelard's epistemology is primarily concerned with scientific investigations and "the problem of scientific knowledge" (*ibid.*:13). Thus, the postulates, hypotheses, and interpretations on which this study reposes are epistemologically distinct from those of Festinger and bring us to different conclusions. The data is nonetheless similar. On Festinger's theory, the paradigm gives an irrational agent guided by his emotions and given social support by his fellow believers. On the alternative theory, the Boudon-Peirce paradigm, we are concerned with an agent who is motivated by reason and who will change his beliefs only after an exhaustive analysis of both the facts and the propositions available to him.

What precisely are Festinger *et al.* (1956) saying in *When prophecy fails*? "Dissonance produces discomfort and, correspondingly, there will arise pressures to reduce or eliminate the dissonance" (*ibid.*: 26). Epistemologically, the cause of the change of belief is emotional. Emotional discomfort dictates either the addition of consonant elements, the withdrawal of dissonant elements, or a reduction in the perceived scope of the dissonance. Furthermore, Festinger links together the full range of followers' beliefs, doctrines, and practices: "The fact that the predicted events did not occur is dissonant with continuing to believe both the prediction and the remainder of the ideology of which the prediction was the central item. The failure of the prediction is also dissonant with all the actions that the believer took in preparation for its fulfillment" (*ibid.*: 27). However, the account of Laurianne's experience and above all the numerical representation of the intensity of her affiliation (cf. figure 1) show that her beliefs are not linked one to the other, but rather that it is a matter of the values that have a unifying force strong enough to be the occasion of disaffiliation in 71% of cases. In conclusion, it appears that the choice of paradigm has a major influence on the researcher's interpretations and on the explanatory factors put forward.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## Notes

<sup>1</sup> Normative beliefs are based on what is good, just and beautiful (Boudon, 1999: 105); they are “beliefs that can be called neither true nor false, but whose authority can be analyzed in rational terms” (Boudon, 1986: 93). According to this author, religious beliefs fall into this category.

<sup>2</sup> Piaget (1974) uses “real contradictions,” whereas his followers, Grize and Piérault-Le Bonniec (1983: 7), prefer the expression “natural contradictions.” For his part, Festinger (1957: 2), seeks to distance himself fully from the logical definition of the expression and prefers to use the term “dissonance.”

<sup>3</sup> Beliefs that are objectively true (unambiguously determined to be true or false through the management of the evidence) and beliefs that are subjectively true (considered true by the individual independently of the arguments used to support this truth) are considered in a similar way.

<sup>4</sup> A factual contradiction is meant to include contrary and contradictory events, as we wish to focus on conditions involving subjective truth. We are presenting the principle of contradiction as valid without discussing its validity, but are aware that many oppose this view (Priest, 1985; Lukasiewicz, 2000). This important discussion cannot be presented in detail in this paper.

<sup>5</sup> You can only observe and accept that the child that you brought into the world is a girl and not a boy.

<sup>6</sup> Rationalization is defined here using its psychological, not Weberian, meaning. According to Hardy-Bayle, a rationalization is an explanatory process that obeys the rules of logic and during which “the subject attempts to justify, that is to say make rational and coherent, thus reasonable to accept, a behavior deemed abnormal or that is based on unconscious mechanisms (the true motives) which cannot be explained. This attitude allows the subject to conceal the various conflicting elements held by him” (Hardy-Bayle, 1998: 601). However, according to Beauvois, a rationalization is an adjustment of the motivations, attitudes or beliefs that a subject makes “*a posteriori*” in order to make them compatible with an action performed in response to the demands of a third party (Beauvois, 1998: 601).

<sup>7</sup> The “cognitive framework” is “the set of beliefs, perceptions and knowledge that an individual utilizes in all processes involving thinking, reasoning and action. It is specific to each individual as it is constructed by accepting or rejecting propositions, beliefs, norms and values encountered by him during his life in a given context. The factors used by the individual when he is faced with all kinds of stimulations will depend upon the availability of the information in his mind. In so doing, the cognitive framework “envelops the thought” (Sauvayre, 2012).

<sup>8</sup> For more information on the discussion of emotions and values, see Gibbard (1990), Tappolet (2000) or Livet (2002).

## References

- Alchourrón CE, Gärdenfors P and Makinson D (1985) On the Logic of Theory Change: Partial Meet Contraction and Revision Functions. *The Journal of Symbolic Logic* 50(2): 510-530.
- Bachelard G (2004) *La formation de l'esprit scientifique: contribution à une psychanalyse de la connaissance*. Paris: Vrin.
- Beauvois J-L (1998) Rationalisation. In: Doron R et Parot F (éd) *Dictionnaire de psychologie*. Paris: Presses Universitaires de France, 601.
- Boudon R (1986) *L'idéologie ou l'origine des idées reçues*. Paris: Fayard.
- Boudon R (1992) Action. In: Boudon R (éd) *Traité de sociologie*. Paris: Presses Universitaires de France, 21-46.
- Boudon R (1999) La rationalité axiologique : une notion essentielle pour l'analyse des phénomènes normatifs : L'interdisciplinarité ordinaire. Le problème des disciplines en sciences sociales. *Sociologie et sociétés* XXXI(1): 103-117.
- Boudon R (2003) *Raison, bonnes raisons*. Paris: Presses Universitaires de France.
- Bower G et Forgas JP (2000) Affect, memory, and social cognition. In: Eich E (ed) *Cognition and emotion*. Oxford: Oxford University Press, 87-169.

- Brewer WF (1986) What is autobiographical memory? In Rubin DC (ed.) *Autobiographical memory*. Cambridge: Cambridge University Press, 25-49.
- Brown R and Kulik J (1977) Flashbulb memories. *Cognition* 5(1): 73-99.
- Buchanan TW (2007) Retrieval of Emotional Memories. *Psychological Bulletin* 133(5): 761-79.
- Chauviré C (2003) *Le grand miroir. Essais sur Peirce et sur Wittgenstein*. Besançon: Presses Universitaires Franc-Comtoises.
- Collins HM and Cox G (1976) Recovering relativity: Did prophecy fail? *Social Studies of Science* 6(3): 423-444.
- Conway MA and Pleydell-Pearce CW (2000) The construction of autobiographical memories in the self-memory system. *Psychological review* 107(2): 261.
- Dague P (2003) Abduction. In: Houdé O, Kayser D, Koenig O, Proust J et Rastier F (éd) *Vocabulaire de sciences cognitives: neuroscience, psychologie, intelligence artificielle, linguistique et philosophie*. Paris: Presses Universitaires de France, 25-27.
- Davidson D (1991) *Paradoxes de l'irrationalité*. Combas: Éditions de l'Éclat.
- Festinger L (1957) *A Theory Of Cognitive Dissonance*. Stanford: Stanford University Press.
- Festinger L, Riecken HW and Schachter S (1956) *When prophecy fails*. Minneapolis: University of Minnesota Press.
- Forgas JP (1995) Mood and Judgment: The Affect Infusion Model (AIM). *Psychological Bulletin January 1995* 117(1): 39-66.
- Gibbard A (1990) *Wise choices, apt feelings: a theory of normative judgment*. Cambridge: Harvard University Press.
- Grize J-B and Piérait-Le Bonniec G (1983) *La Contradiction : essai sur les opérations de la pensée*. Paris: Presses universitaires de France.
- Hardy-Bayle M-C (1998) Rationalisation. In: Doron R et Parot F (éd) *Dictionnaire de psychologie*. Paris: Presses Universitaires de France, 601.
- Holland AC, Kensinger EA (2010) Emotion and autobiographical memory. *Physics of Life Reviews* 7(1): 88-131.
- Livet P (2002) *Émotions et rationalité morale*. Paris: Presses Universitaires de France.
- Lukasiewicz J (2000) *Du principe de contradiction chez Aristote*. Paris: L'Éclat.
- Melton JG (1985) Spiritualization and reaffirmation: what really happens when prophecy fails. *American Studies* 26(2): 17-29.
- Oishi S, Schimmack U, Diener E, Kim-Prieto C, Scollon CN and Choi D-W (2007) The Value-Congruence Model of Memory for Emotional Experiences: An Explanation for Cultural Differences in Emotional Self-Reports. *Journal of Personality* 93(5): 897-905.
- Pareto V (1917) *Traité de sociologie générale*. Lausanne: Payot & Cie.
- Peirce CS (1931) *Collected papers of Charles Sanders Peirce*. Cambridge: Harvard University Press.
- Piaget J (1974) *Recherches sur la contradiction. Tome 1, Les différentes formes de contradiction*. Paris: Presses Universitaires de France.
- Priest G (1985) Contradiction, Belief and Rationality. *Proceedings of the Aristotelian Society* 86: 99-116.
- Sauvayre R (2012) *Croire à l'incroyable*. Paris: Presses Universitaires de France.
- Sauvayre R (2011) Le changement de croyances extrêmes : du cadre cognitif aux conflits de valeurs. *European Journal of Social Sciences* (147).
- Talarico JM, LaBar KS and Rubin DC (2004) Emotional intensity predicts autobiographical memory experience. *Memory & Cognition* 32(7): 1118-1132.

- Tappolet C (2000) *Émotions et valeurs*. Paris: Presses Universitaires de France.
- Tulving E (1985) Memory and consciousness. *Canadian Psychology* 26: 1-12.
- Vanderveken D (1988) *Les actes de discours: essai de philosophie du langage et de l'esprit sur la signification des énonciations*. Liège: Éditions Mardaga.
- Weber M (1998) *Economie et société*. Paris: Presses Pocket.