Chapter 2
Personality in a Nutshell: Understanding Who We Are

As social animals that seek to manage their relations with others, we need to understand each other. Understanding here means the interpretation of overt behavior and communicated signals but also inferences about implicit thoughts and the prediction of future moves. These mental models of others that we build in our mind are usually unconscious and include naive theories of personality. However, at a higher level of cultural development, these unconscious and naive models may turn into conscious, conceptual and even scientific theories. In addition, these mental models may start as tools for modeling others but may turn inward into models of understanding ourselves. In this context, the concept of personality may be used to describe the mental models we build about the individual's mind.

Funder (1997, pp. 1–2) defines personality as the "individual's characteristic patterns of thought, emotion, and behavior, together with the psychological mechanisms—hidden or not—behind those patterns." This theoretical definition is of course too general to enable us to resolve the enormous conceptual difficulties about the meaning of personality as discussed in the literature (Saucier 2009). In this context, we should realize that there are two different approaches to what it means to define something. The first approach, which has the flavor of what is called in philosophy "naive realism," assumes that the concept we aim to define somehow represents an a priori "real" object in the world. According to this approach, the concept of personality is a theoretical construct that aims to represent a *real* pattern or system that existed prior to any form of theorization. A different and less naive approach, which has been shown to be extremely fruitful in the history of science, suggests that our theoretical constructs and measurement processes actually *define* our object of inquiry rather than simply representing or measuring it. The ideas of imaginary numbers and potential energy are just two instances that prove the superiority of this approach over the naive one. It is also an approach that is deeply pragmatic, in the sense that it seeks to do something through the definition and measurement processes of a certain object rather than to faithfully represent a divine platonic realm that exists beyond the limited perspective of human beings. The Greek mathematicians invented the idea of irrational numbers,

regardless of the fact that this concept has no simple correspondence with a real-world object or its measurement. In fact, the idea of irrational numbers was found to be an extremely powerful tool *regardless* of its counterintuitive character.

The two approaches to definitions are actually caricatures used to emphasize theoretical differences. However, if we adopt the more pragmatic approach in the context of personality research, we can start with the basic and commonsense assumption that human beings should understand others (and themselves) by building integrative mental models of individuals' thoughts, emotions and behavior, in order to optimize communication, correct communication errors, predict future moves, monitor and control others and oneself, and so on. Let me explain this idea.

First, the models we build of others are "mental" in the sense that they exist in our mind. As such, they are abstract representations. These models are not necessarily conscious or sophisticated; they may just be forms of minimal representation and organization that we use in order to make sense of others and of ourselves. The models are also "mental" in a different sense. We assume that others build mental models of the world, like we do. Therefore, when building mental models of personality, we actually build mental models of mental models. This is an important point as it pertains to what is described as the *Theory of Mind*. Personality research is about how experts theorize the minds of individuals through the individual's theories of mind. A sociologist may explain the behavior of a certain individual through the concept of social class. For example, in contrast with Michael's decision to be an engineer, Patrick's decision to be a boxer may be explained by a sociologist as a behavior resulting from the fact that Patrick belongs to the working class while Michael belongs to a higher class. The explanation may be that, as the lower classes have fewer opportunities to climb the social ladder, their members are forced into careers that involve high risk and a low probability of good wages. Only a few boxers will be successful (similarly to criminals—another career choice that may be appealing to the lower classes), while being an engineer is almost certainly a safe bet. In contrast with sociologists, however, personality theorists focus on the individual's *level of analysis* and seek to explain the individual's mental models of self and others and the behaviors that result from those models. That is, the models are those of *individuals* (rather than classes, for example) and of the mental models that guide the behavior of these individuals.

For analytical reasons per se, we may consider these abstract representations/schemes of others in terms of *thoughts*, *emotions* and *behavior*. By using the phrase 'analytical reasons', I mean that in practice our mental models integrate thoughts, emotions and behavior and that the artificial separation between the three concepts is done for conceptual simplicity and clarification only.

Thoughts can be described in terms of propositions that frame and guide our representations of others. Propositions are basic units of meaning that can be formalized as predicate-argument structures (Kintsch 1998). Specifically, if I think that Danny is a trusty fellow (argument), I represent a characteristic of Danny that may help me to frame, explain and predict his behavior (predicate). *Framing* is the way we organize information in a meaningful way, *explanation* involves the identification of causes and *prediction* involves the anticipation of future behavior. If I

frame Danny as a "trusty" fellow, I can explain his behavior (e.g. Danny was quick to return money borrowed from me *because* he is a trusty fellow) and predict his behavior (e.g. I can give a loan to Danny as I'm almost sure that he will pay it back).

Thoughts of course are deeply intermingled with behavior. When I taste a piece of food, I can differentiate between a sweet taste and a rotten taste, and these thoughts may lead to differential behaviors. Thoughts are basically about categorization (Harnad 2005)—that is, knowing that something is X and something else is Y. Experiencing the taste of chocolate is therefore a thought/cognition/categorization deeply associated with behavior (e.g. attraction to sweet food). Food experienced as rotten, which is another form of categorization/thought, would lead to a diametrically opposed behavior, which is repulsion.

Thoughts are deeply intermingled with emotions too. The self-defeating thought "I'm a loser" is a proposition or a belief about myself that is loaded with a strong and negative emotional valence, where valence is the attractiveness (i.e. positive valence) or aversiveness (i.e. negative valence) of an object, event or situation. Thoughts, however, are more about the objects that occupy an individual's mind and their attributes and relations, while emotions are more about the valence associated with these propositions and behavior is more about the actual activities associated with thoughts and emotions (e.g. distancing oneself from what is represented as a 'disgusting' negatively loaded object).

At the most basic level, emotions are about whether the represented object, attribute or action is positive or negative (i.e. its valence) and to what extent (i.e. its arousal). Emotions are deeply associated with feedback loops and reinforcement learning. Sweetness is the result of sugar activating specific receptors on our tongue. The valence associated with this representation is in itself a representation that motivates and guides our behavior. Through reinforcement learning, sugary taste and its highly positive valence may lead to a positive feedback loop via which we might become addicted to sugary taste and as a result suffer from obesity.

In sum, this discussion has so far assumed that human beings build mental models of others' mental models and that a generic term for these models is "personality." Up to now we have been talking about naive theories of personality rather than about scientific theories, which describe mental models of individuals' relatively stable patterns of thought regarding the thoughts, emotions and behaviors of other individuals. The task of scientifically modeling these patterns is the *raison d'être* of academic personality research. The following sections aim to present some of the major models and theories of personality. It must be kept in mind that, following the pragmatic meaning of definition and measurement that I presented above, the value of personality models and theories is to be found in the outcomes of the measurement processes derived from these theories. For example, suggesting that human beings are extraverts or introverts is meaningless without a well-structured, reliable and valid procedure for measuring this personality trait and using the outcome of this procedure in a meaningful way. We may have a theoretical definition of extraversion but the next step is to have an operational definition that specifies the procedure through which me may measure this trait. Given

the results of this measurement process, we may ask how helpful these results are for achieving a specific task such as improving a personalized recommender system, tracing the trajectory of a mental health problem and so on. We will keep this pragmatic approach in mind as we move on to the most popular model of personality, the five-factor model.

2.1 The Five-Factor Model of Personality

I am introducing the five-factor model of personality (FFM) , also known as the Big Five, first because it is described by its proponents as the default model of personality structure (McCrae and Costa 2013) and because it is the most popular model used in automatic personality analysis.

To understand the model, we first have to understand one of the major difficulties in personality research, which is how to identify basic personality traits. The *lexical approach* to personality research (e.g. Wiggins et al. 1988) suggests that human naive use of language encodes indispensable information about our mental models of others and that this information is the key to identifying basic personality traits.

In our daily use of language, we use numerous terms to describe others: bitter, liberal, arrogant, friendly and so on. Now, we can identify all of these descriptive terms, present them to a representative sample of subjects and ask the subjects to rate the extent to which each term describes them. In a variation of this procedure, we may ask subjects to rate the extent to which descriptive terms represent other subjects, but the basic logic of this procedure is the same. At this point, we have self-reported measurements and we may try to examine how these measurements cluster together into several chunks in order to uncover basic factors of personality. Is it possible that terms such as "self-critical" and "depressed" are clustered together? Or terms such as "friendly" and "sociable"? The most popular statistical methodology for producing such clusters of personality is *factor analysis*. It is argued that, when factor analysis is applied to the above types of questionnaires that measure self-reported descriptive terms, five "factors" or "dimensions" arise (McCrae and Costa 2013). These factors are titled "neuroticism," "extraversion," "openness to experience," "agreeableness" and "conscientiousness."

Neuroticism is about being anxious, nervous and worried and in general about being emotionally negative. The complementary dimension to neuroticism is described as "emotional stability." Extraversion is defined by sociability, assertiveness, cheerfulness and energy. It is about being energetic, assertive and forceful. The complementary aspect to extraversion is "introversion" which relates to being shy, cautious and unassertive. Openness to experience is described using terms such as "reflective," "imaginative" and "unconventional," while being closed to experience is associated with terms such as "conventional" and "rigid." Agreeableness describes an underlying tendency to be cooperative and considerate to others and is associated with empathy, trust and altruism. It is contrasted with being selfish and

arrogant. Conscientiousness is about being organized, self-disciplined and ordered and it is contrasted with being disordered.

We can think about the Big Five, just like any other personality factors, as continuous dimensions (i.e. traits) or as discrete categories (i.e. personality types). In fact, thinking about the Big Five as personality types, we can almost immediately recall certain characters who are prototypes of specific personalities. For example, the American film director Woody Allen is a prototype of a neurotic personality and the famous boxer Mohammad Ali was in his heyday a prototype of an extravert. Pope Francis is an agreeable personality, the cartoon character Homer Simpson is a prototype of a disorganized personality (i.e. the complementary aspect of conscientiousness) and the famous traveler Marco Polo was probably very open to experience.

As can be seen, the FFM is a very simple and appealing model of personality that captures highly intuitive components of what we describe as personality. However, this model is imbued with difficulties, as reviewed in Neuman (2015). Let me present just a few of these difficulties, which, as a result of the model's dominance, have been somehow dismissed by mainstream psychology.

The first problem is that the FFM is based on relations between *variables* while personality lies within the *individual*. The shift between these two levels of analysis is far from trivial and has detrimental consequences for the validity and use of the model. For instance, Molenaar and Campbell (2009) have analyzed the data of 22 subjects who were measured on 90 consecutive days using multiple equivalent versions of the Big Five questionnaire. That is, each subject was asked to fill a personality questionnaire on each day. A quite shocking result of this study was that the variation between individuals didn't match the overall measurements, which means that the results found at the group level of analysis were invalid at the individual level of analysis. Think, for example, about measuring the correlation between being happy and being sad at the group level of analysis. It is fairly obvious that across individuals the correlation between these two variables will be highly negative, as 'happy' and 'sad' are antonyms and one cannot be happy and sad at the same time. However, when we drill down to the individual level of analysis and measure a specific individual across time, we may find that the impressive negative correlation has faded away. The reason is simple. Only a negligible number of subjects are consistently very happy or very sad. In the first case we may call them manic (or too happy) and in the second case we may deem them to be depressive (or too sad), and, if they abruptly shift between the two extreme poles, they suffer from manic depression disorder. Most people, however, moderately fluctuate between the poles of being happy and being sad, and therefore the impressive correlation that we found at the group level of analysis may be relevant to sociological research, or for understanding a negligible part of the population, but not for understanding the personalities of most individuals or the underlying factors of those personalities.

There are other difficulties with the FFM as well. Neuroticism is one of the most important dimensions of the Big Five. It has been found to be significantly correlated with fear, sadness and anger (Davis and Panksepp 2011). Is it possible that

what we call neuroticism is mainly about feeling negative emotions or having negative thoughts? I suspect that this is the case and that, therefore, the dimension of neuroticism can be reduced to a much more basic dimension. Now we can better understand why the FFM has been so successful in academic psychology. As academic psychology mainly deals with finding differences between groups (e.g. the difference between men and women in extraversion) and finding correlations between variables (e.g. the correlation between neuroticism and suicidal behavior), and as the basic experience of feeling negative or positive emotions is correlated with so many variables, it is almost guaranteed that researchers will find statistically significant correlations between negative/positive emotions and neuroticism. However, this book deals with automatic personality analysis, which is a practical field. From this perspective the statistical significance of correlations at the group level of analysis or variations found among the items of a self-report questionnaire might be of minor importance for real-world applications. Real-world applications are mostly concerned with classification and prediction at the *individual's level of analysis*. For example, when developing a system to automatically distinguish extraverts from introverts based on voice recognition, we would like to know how successful the system is in *classifying* subjects as either extraverts or introverts.

Let us assume that we have a balanced corpus of 500 extraverts and 500 introverts who have been diagnosed as such by three expert psychologists. Let us also assume that the psychologists' judgments have high reliability, meaning that they agree between themselves on who is an extravert and who is an introvert. In our experiment, each subject is asked to read aloud three pieces of text while his voice is recorded and analyzed. Next, we try to use the features extracted from the analysis of the voice to decide whether each of the given subjects is an extravert or an introvert. In this context, we may use measures such as precision and recall. Precision asks how many of the subjects our system automatically identified as extraverts (for instance) were previously diagnosed by the psychologist as extraverts. Recall, on the other hand, asks how many of the extraverts (for instance) our system successfully identified out of the total number of extraverts in our corpus. One seldom finds psychological studies in personality in which the researchers successfully apply a classification procedure, testing their results by using measures such as precision and recall. This is a disturbing state of affairs for someone who would like to develop real-world systems based on psychological knowledge, and it explains why the majority of published studies in psychology cannot be replicated (Open Science Collaboration 2015). Let us focus our critique by using a single example.

Let us assume that the FBI is seeking to screen potential school shooters for in-depth inspection by automatically analyzing the social media materials of a massive number of subjects. In this context, the FBI is not interested in correlations between variables but in successfully identifying *individuals* who may pose a threat to the public's safety. In this case, precision is a highly important factor as it asks how many of the cases our system identified as a threat are really a danger to public safety according to some agreed criteria. In this context, correlations at the group level of analysis are of no use, or is a statistically significant regression analysis.

The problem is powerfully evident in any attempt to identify rare events, and particularly in the case of ethnic profiling. For example, for MI5, it is clear that there is a statistically significant association between religious affiliation and domestic terrorism. There is no need for a sophisticated psychological analysis. However, this association is irrelevant for the purposes of screening potential terrorists; while the probability of being a Muslim given that one is a terrorist is very high, the probability of being a terrorist given that one is a Muslim is very low. In this case, the statistically significant association is of no use unless it is somehow accompanied by a valid procedure for identifying the needle in the haystack.[1]

In sum, on the positive side, the FFM is simple, intuitively appealing and represents some psychological traits that have been known since antiquity (e.g. neuroticism and extraversion). On the negative side, it is doubtful whether, given the critiques of the FFM (e.g. Block 1995) and its over-simplicity, it is of significant relevance for real-world applications. I have used the FFM in several of my studies but consider this use as the very first step in automatic personality analysis and not as either the ideal model or the final step.

2.2 The Psychodynamic Approach

The psychodynamic approach to personality has its roots in psychoanalysis, although it has been substantially transformed since the early days of Freud and his seminal work. The basic idea of personality, as adopted by the modern psychodynamic approach, is the same as the general one presented by Funder (1997; see the opening of this chapter). However, it focuses on personality as the ways in which "we habitually try to accommodate to the exogenesis of life" (Alliance of Psychoanalytic Organizations 2006, p. 18). This is a functional approach to personality; life is imbued with anxiety and human beings have developed ways of defending themselves against anxiety. These well-structured coping strategies are actually what personality is all about. Although personality cannot be reduced to our coping styles, such styles constitute a major part of our personality. When they are used in a non-adaptive, harmful and painful way, they are called "personality disorders." For example, let's assume that Sarah suffers from social anxiety. Whenever she faces a situation in which she is expected to interact with other people, Sarah experiences a strong negative arousal accompanied by thoughts of mockery and humiliation (e.g. "They are going to laugh at me") and as a result adopts a coping style of avoidance by distancing herself from social and potentially painful interactions. Sarah would have liked to interact with other people but her coping repertoire includes only one strategy, which is total avoidance. It is quite legitimate to avoid certain social interactions, but avoiding all kinds of human

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[1]The needle-in-the-haystack problem may seem to be unsolvable, but in fact there are creative ways to approach it successfully.

interaction is a rigid and non-adaptive strategy. As a result of using this coping strategy indiscriminately, Sarah might experience deep loneliness and pain and be categorized as suffering from a personality disorder.

Traditionally, the psychodynamic approach has been focused on personality disorders and not on healthy, normal personalities. This is a major obstacle for its application in computational personality analysis. However, this approach is theoretically grounded and presents concepts that may be used to analyze normal human beings and not only extreme cases of personality disorders. The personality disorders discussed by the psychodynamic literature may therefore be understood as the non-adaptive patterns of thoughts, emotions, relations and defensive functioning that exist among all human beings. In this context, automatically analyzing texts in order to identify defensive mechanisms and using these mechanisms to measure the distance between a specific text or person and one of the prototypes identified by the modern psychodynamic approach (Westen et al. 2012) may be of great value for various real-world applications.

Defense mechanisms can be more or less sophisticated as a function of the degree to which they distort reality. *Splitting*, for instance, is a primitive defense mechanism in which positive and negative qualities of the self and others are separated to such a degree that they may form two distinct objects: a bad object and a good object. For example, let's imagine that an infant is asking his mother for a piece of candy. When the mother refuses to give him the candy, the infant may burst into tears and experience deep rage against his mother, thinking of her as "bad." However, a couple of hours later he calms down and, when his mother embraces him, he feels secure and his mother is conceived as "good." According to the theory of Melanie Klein, this situation in which the mother is both good and bad is too complex for the infant to understand and he therefore "splits" the representation of his mother into two objects: the good mother and the bad mother. In other words, the difficulty he experiences in processing the complexity of life is resolved through the use of a simple, distorting and therefore primitive mechanism of defense. While there exists no clear supporting evidence of the developmental process described above, the idea of splitting in its general sense is of high diagnostic value. Those who describe women in terms of saints or whores, those who see the world as a battle between Satan and God, and those who oscillate between unrealistic positive and negative representations of themselves or others are all involved in a non-adaptive attempt to defend themselves from a threatening anxiety. As will be illustrated later, identifying the splitting mechanisms in texts may be of high diagnostic value in identifying potential offenders such as violent political radicals.

Splitting is an example of a primitive defense mechanism. As we mature and hopefully learn to cope with the anxieties of life in more sophisticated ways, we may adapt different mechanisms, such as humor. Humor allows us to see a painful experience from a different perspective that doesn't deny the reality of this experience but *reframes* it in a more digestible form. While humor is usually discussed in the psychodynamic literature as a sophisticated defense mechanism, I believe that it is a sophisticated defense mechanism only when it comes in a sophisticated form.

The jester, for instance, was known since early Ancient Greece as someone who made his living by making fun of other people for the amusement of his master. His humor was actually a form of ridicule, which is, as has been insightfully analyzed by Billig (2005), deeply associated with embarrassment and social control. That is, the humor used by a jester cannot be considered as a sophisticated form of defense mechanism but was rather a tool for ridiculing and socially embarrassing people in order to establish the social status of the jester's master. It was a sophisticated form of social aggression and control in the form of cultural and verbal sophistication. Along the same lines, racial jokes are not an indication of a sophisticated defense mechanism in action. In contrast, when Freud was interrogated by the Nazi Gestapo, he commented on this situation by writing with heavy irony that he heartily recommended the Gestapo to everyone. In this case, the use of humor was a clear defense mechanism used by Freud to protect himself against the anxiety caused by his encounter with the Gestapo. Humor, as we can see, may be considered to be a sophisticated defense mechanism when it deals with our own self (self-humor) in a reflective, sophisticated and sublime manner.

The Alliance of Psychoanalytic Organizations (2006) explains personality types and disorders by using several dimensions: central tension/preoccupation, affect, beliefs about self and others, and central ways of defending. The dimension of central tension/preoccupation suggests that human personality is organized around an axis or around personality themes. For example, the paranoid personality is organized around the theme of attacking or being attacked by humiliating others. Think, for example, about some of the texts produced by radical Islamists who turn their rage against the United States. A specific case, such as the Shia Hezbollah movement in Lebanon, may be of great interest, as these people consider the United States to be the "Great Satan" (a term originating in Iran) and describe Americans as a bunch of Christian crusaders who are operating aggressively and in a humiliating way against the Islamic world. Therefore, they argue, the United States is a legitimate target for an attack. Now, is this description of any psychological value? After all, these Islamists' ideology may be considered by some to be legitimate and is grounded in (albeit not necessarily justified by) the life experiences of some Muslim populations that have suffered as a result of Western imperialism.

Here, we should understand an important point (equally applicable to thinking about individuals and groups), which is that a personality theme is powerfully evident whenever *an incoherent aspect of a narrative* is identified. In the case of Hezbollah, there is strong awareness of the dilemma between attacking or being attacked by the American imperialist crusaders while there is a *total denial* of the fact that the Russians (who might also be termed "crusaders") have for many years had an imperialist hold in Lebanon, which is evident in the military base in the northern city of Latakia and in the Russians' violent actions against the Muslim population in Syria as a part of their support of the Syrian regime. In other words, the point at which we identify a psychological theme of interest is the point at which we identify a certain fixation (i.e. theme) and holes (i.e. incoherence) popping up in the narrative constituting this major theme of personality. After all, if active Islamists such as affiliates of Hezbollah strive to rebel against the American

crusaders, how is it that they peacefully tolerate the existence of the Russian crusaders?

With regard to the paranoid personality, in this example, we see it expressed in the theme of attacking or being attacked, in beliefs that the self is hated and that others are potential attackers and abusers, in feelings of fear and rage, and in the use of the defense mechanism known as "projection," which entails the attribution of certain parts of one's self to others. For example, since the paranoid feels enormous aggression against others, he attempts to get rid of this aggression by attributing it to others. The paranoid is also occupied with trust issues and has a suspicious personality, as he suspects others will attack, abuse and humiliate him. However, the paranoid sometimes oscillates to the other pole: ultimate trust, which is just as unrealistic as his extreme suspicion. Think, for example, about the followers of conspiracy theories. They usually attribute malevolent intentions to others whom they claim are the hidden cause behind important events. It has been firmly established that the Al-Qaeda terror organization, under the leadership of Osama bin Laden, was responsible for the terrorist attacks of September 11. However, the zealous followers of the conspiracy theories surrounding September 11 trust neither the "official" version of the story nor any scientific refutation of their alternative theories. If these guys were authentic skeptics, they might be expected to turn their suspicion not only against the "official" version of the story but also against its non-official refutations. However, the psycho-logic of those who follow conspiracy theories is such that there is a negative correlation between the passion with which they suspect the official theories and the trust they place in various forms of alternative junk. This is a clear-cut case of paranoid thinking, which is organized around the themes of aggression and trust.

The second personality type that I would like to present is schizoid-schizotypal. In this case, the conflict concerns the desire versus the fear of closeness. The schizoid is afraid of being in love or being dependent as others might threaten his autonomy, so he defends himself via social avoidance. The schizoid seems to be detached, with an odd social appearance and peculiarities in interpersonal relations and thought processes. A prototype of this personality type is Willy Wonka from *Charlie and the Chocolate Factory*. If you have seen the film directed by Tim Burton (Grey et al. 2005), you can imagine the character of Wonka, who is socially isolated, living his life with a group of bizarre workers at his chocolate factory and avoiding any significant social interaction after a painful childhood trauma caused by his sadistic father, who was… a dentist. His appearance is odd, to say the least, and his thoughts, although creative to some extent, are clearly different from the norm, as are his human interactions, which seem to be out of touch with how adaptive people behave in society.

Here is another personality type. The antisocial "psychopathic" personality is occupied with the theme of manipulating others and avoiding being manipulated. A prototypal character of this personality is Dr. Hannibal Lecter, the cannibal psychiatrist in *The Silence of the Lambs* (Utt et al. 1991). Hannibal the cannibal enjoys manipulating the FBI agent, played by Judy Foster, with a sense of mega-lomaniac importance indicating a pathologically abnormal belief about the self.

Indeed, trying to gain omnipotent control is his major defense mechanism, as expressed in his attempt to manipulate and exploit others in cold blood with no empathy or remorse. Psychopaths don't seem to experience fear as in the game they play; they are the hunters and their victims the prey.

The narcissistic personality is one of my favorites, as, in Western culture, in which the individual has become the center of attention, you might expect to find narcissists everywhere. This personality is organized around the theme of self-esteem and the inflation versus the deflation of self-value. The narcissist holds a grandiose sense of himself that actually covers a vulnerable self. He believes that he must be perfect otherwise others will not like him. Therefore, he attempts to deal with his shaky self-esteem by idealizing some (including himself) and devaluing others, through critique and dismissive behavior. Think, for example, of the great boxer Mohammad Ali, who said that he was the greatest even before he knew it. The biblical book of Proverbs advises: "Let another man praise thee, and not thine own mouth; a stranger, and not thine own lips." From a psychological perspective, it seems that this advice aims to warn us against the danger of narcissism. Those who believe in self-superlatives and that they are the greatest, the most beautiful, the most brilliant and so on are narcissists trying to defend themselves against an inner feeling of emptiness, and, while they are praising themselves, they usually devaluate others in order to prevent any competition for the title of the greatest.

The depressive personality is organized around the theme of goodness and badness. Depressive people critically blame themselves for not being good enough and therefore experience sadness, shame and guilt. Depressive people believe that they are inherently defective and that people who really get to know them will probably reject them. Therefore, they are concerned about loss and abandonment. Groucho Marx, who humorously said that he did not want to be a member of a club that would accept people like him as members, expressed a great sense of humor— albeit humor indicating a depressive position. The depressive personality's devaluation of the self is therefore a defense mechanism that prevents individuals from taking part in social interactions that may "prove" their inferiority. Interestingly, the Marx brothers were Jews, and this form of sophisticated, reflective and… depressive sense of humor seems to be a cultural mark of the early generations of Jewish immigrants to the United States.

The dependent–victimized personality is occupied with keeping and losing relationships, as such people believe they are impotent and inadequate if they are not nurtured by relationships with powerful others. Being far from such a powerful other is accompanied by the distress of separation, similar to what a baby probably feels when left alone. Therefore, the dependent personality defense mechanism involves regression to infantile behavior. Marilyn Monroe, who played the character of an infantile blonde woman, might be mistaken for a dependent personality. Her *character* was that one of an infantile dependent personality, but in real life Monroe was an intelligent women who read Freud. Monroe suffered from depression, possibly resulting from the inability of her social milieu to acknowledge her real value as an intelligent individual.

The obsessive–compulsive personality is organized around the theme of control—or, more specifically, around the theme of gaining and losing control. This personality believes that anger should be controlled and that it should defend itself by isolating affect, putting emotion aside. These people are overly rational, emotionally constricted and rigid, and highly ordered and task oriented. The obsessive–compulsive personality is an excellent illustration that the same characteristics may be positive and adaptive but also in a different context self-defeating and disordering. For example, a person who is a task-oriented control freak who can put his emotions aside in order to undertake a rationally motivated action could make an excellent emergency surgeon. However, in his personal life, being a control freak might cause him to fall apart in situations where he has no full control, to feel "dead" when his emotions are put aside and to fail in close intimate relations when his rational approach is misused as a substitute for an intuitive and deep affective understanding. This is an excellent point at which to introduce the cognitive–behavioral theory of personality into the picture.

2.3 The Cognitive–Behavioral Approach

The cognitive–behavioral approach, developed by Beck et al. (1990), argues that we have genetically determined schemes that have developed to support our survival and that these schemes are information-processing frames through which we represent and interpret the world. These schemes are what actually guide our affective experience and behavior and they may be located on a scale ranging from overdeveloped to underdeveloped. For example, an obsessive personality has an overdeveloped scheme of control and an underdeveloped scheme of spontaneity. As we can see, the cognitive–behavioral approach emphasizes the importance of schemes (i.e. thoughts) that guide us and the importance of a well-balanced use of these schemes.

The personality types discussed in this approach are the same as those presented previously but the interpretation is a little different. This point can be explained through the schemes guiding the obsessive personality. To better survive and adapt, human beings should have some level of control over their lives. Cleaning your house is a form of control, as is maintaining your personal hygiene, as it allows you to avoid the harmful influence of some bacteria. Making sure your office is in order involves controlling the spatial location of objects and may help you to find them easily. Rituals are a form of control, as performing a set of actions in the same order is clearly helpful for the purposes of retrieving them from memory. However, the importance of control must be balanced by the importance of spontaneity. A mother who is trying to fully control the personal hygiene of her baby by keeping him from any contact with dirt is hurting the healthy development of his immune system and might cause the development of autoimmune diseases. The same is true for order. Order is important but, when it reaches a certain level, it blocks spontaneous and

creative processes, which are at the heart of all living systems. Locating a person on the scale of order and spontaneity may help us to better understand him.

Let us present another example, which is the paranoid personality. According to Beck, all of us should maintain a healthy balance between trust and distrust. As babies we must trust our caregivers to fill our basic needs and as adults we understand that trust is a constituting aspect of social life. However, we also learn that there are some people who cannot be trusted and that trust is a highly contextual issue. What we call a paranoid personality is according to Beck a person with an overdeveloped scheme of distrust. The paranoid personality is guided by a scheme that conceives the self as vulnerable and others as vicious. The paranoid assumption is that trusting others is dangerous as it might lead to exposure to an attack. The conclusion is therefore "Don't trust." What about the narcissistic personality? According to the cognitive–behavioral approach, and following the psychodynamic approach, we should all love ourselves and think highly of ourselves. A person who has a healthy self-love may take care of himself and may consider himself highly in a way that motivates him to act in the world. On the other hand, this "superiority" should be balanced by a healthy feeling of "inferiority," putting human potential grandiosity in the right perspective. One of the greatest Hassidic Rabbis, Menahem Mendel of Kotsk, said once that a person should walk with two notes in his pocket. On the first note should be written: "This world has been created for me." This note emphasizes the narcissistic aspect of our personality and that when loving ourselves we are the center of the world. This note is to be used whenever we feel depressed. To encourage us, the note asks us to experience a large amount of self-love. The second note says: "I'm ashes and dust." It points to the inherent inferiority of human beings, who have been created from dirt and are destined to return to dirt when they die. This note is to be used whenever we experience narcissistic grandiosity that needs to be cooled down. The Rabbi of Kotsk probably grasped a very deep truth about human personality a long time before psychology became a discipline.

The cognitive–behavioral approach gives us the idea that, if we would like to understand personality, we should try to identify the *belief systems* of a person and map them onto the predefined personality types by identifying the location of the subject on each of the schemes. For example, let's assume that you would like to develop a personality-based ad-targeting system. The system should automatically identify the personality of a subject by analyzing the text of the subject's blog and filling in a predefined advertisement templates so that it will attract the attention of the specific subject. One possible advertisement could propose to aging men a new shampoo that may help them to avoid losing their hair. After identifying aging men through meta-data associated with the text, we send them the ad, which has been completed with certain keywords and phrases that may attract their attention to such a level that they will click on the ad. Different ads should be sent to different personalities. For the narcissist, who is occupied with schemes of superiority and self-grandiosity, we can use the ad: "The perfect product for the perfect man." For the paranoid personality, which is occupied with trust issues and the danger of aggression, we can use the title: "The world is a stressful place! Don't lose your

hair!" The question now is how to identify the narcissist or the paranoid. As we have previously explained, the narcissist is occupied with self-love and grandiosity and therefore with issues of social superiority. Therefore, we may first try to identify in his texts words or phrases pertaining to high social status. This can be easily done by first identifying textual sources associated with the norms of the upper classes, such as *Vanity Fair* or the British *Tatler*. Using these texts, we may identify the words and phrases uniquely characterizing the upper classes and measure how far the blogger's written texts differ from the words that characterize these high-class magazines. The closer they are, the higher is the personality score on the narcissistic dimension. This is of course a very limited heuristic as one can write in a style characteristic of high-class magazines without this style having anything to do with one's personality. Therefore, a more direct procedure for measuring one's beliefs is needed. Let's say that we find the following piece of text in a blog:

> I am a brilliant person. There is no doubt that I am much more successful than most people. My stupid brothers were educated at a community college while I graduated from Harvard. I admire celebrities like me who are over and above the madding crowd.

This statement clearly may support the hypothesis that its author is ranked high on the narcissistic scale. We can process this excerpt using an automatic syntactic parser that produces the syntactic structure of a given text. Parsing the first sentence, we get the following syntactic tree:

```
(S (NP I)
   (VP am
   (NP a brilliant person)))
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Next we can try to generate a predicate–argument structure (see the introductory section of this chapter) that allows us to identify the text's most basic units of meaning: its propositions. For example, using a simple algorithm, we can see that the noun phrase "a brilliant person" is an argument associated with the first-person pronoun "I" through the verb "am." This proposition can be represented as follows, where the arguments are located inside the square brackets and the predicate is located outside:

$$AM[I, A BRILLIANT PERSON]$$

Now, when we are trying to understand the belief system of a person, specifically his beliefs about himself, arguments associated with the first-person pronoun "I" through specific predicates may have significant diagnostic value. (At this point, we might ask how to translate the above proposition into a narcissism score, but let us leave the tricks of the trade to a later phase.)

Let us briefly summarize the psychodynamic approach and its cognitive–behavioral offspring. The psychodynamic approach is theoretically grounded. It is not a bottom-up approach like the Big Five. In addition, it is much more complex in the sense that it offers a rich repertoire of personality dimensions and their

manifestation in beliefs, affect and defense mechanisms. On the other hand, and despite some attempts (e.g. Westen et al. 2012), its validity is questionable in the sense that it is not clear whether the personality dimensions and their associated aspects are really basic personality factors that are useful for understanding normal human beings specifically when taking cultural variations into account.

In sum, in this chapter, we have learned what personality is. We have taken the approach that, in order to successfully live their lives as social animals, human beings must form mental models of others' minds and of their own mind. These models aim to expose the individual's inner schemes and dynamics in a way that may explain and predict behavior. The exact nature of these schemes and dynamics is a debated issue between the various theories of personality. I have introduced two main theories of personality, the five-factor model of personality and the psychodynamic and cognitive–behavioral approach. There are other theories of personality. Carl Jung, who was Freud's disciple, developed his own theory of personality, which later been materialized in the Myers–Briggs type indicator (Myers 1962). The attachment theory (Bowlby 1988) identified four types of attachment that can be described as personality types. The affective neuroscience approach (Davis and Panksepp 2011) suggests that human personality can be reduced to basic mechanisms we share with other mammals, and I have presented my cognitive–biological theory of personality (Neuman 2015), arguing that all personality dimensions can be explained in terms of threat- and trust-management processes.

A person facing this rich variety of theories may respond by adopting one of two main approaches. The first approach is to choose one and only one theory or model and to dismiss the others. The second approach is relativistic: that, facing this variety of "personality" dimensions and given that there is no clear empirical test for choosing the right from the wrong, all models are equally acceptable. In contrast, the researcher or the practitioner doing automatic personality analysis may adopt a different pragmatic stance. To explain this stance, let us consider the *law of requisite variety*, originally formulated by Ashby (1958). Variety describes the various states in which a system can be. Ashby's law of requisite variety suggests that a modeling (or control) system can successfully model (and control) its domain as long as it has sufficient variety to represent that domain. Think, for example, about the immune system. The immune system has to deal with an enormous variety of pathogens, such as viruses, that rapidly genetically mutate. Now, in order to identify its enemies, the immune system has to recognize them. Immune recognition assumes some kind of modeling of the system's opponents. Therefore, our immune system has been developed in a remarkable way to produce the requisite variety of its internal "representations" (Cohen 2000).

Adopting the idea of requisite variety in the context of automatic personality analysis inevitably results in a pluralistic and pragmatic approach in which all possible dimensions of personality from whatever theoretical perspective are accepted (to a certain extent) as *features* to be used in a real-world modeling application. However, this pluralism is reduced when only relevant features are selected by our model. For example, let us assume that we would like to develop an automatic personality model that predicts who are most prone to suffering from

some kind of addiction as high school students. We may ask school children to write an expository diary for a couple of months and then use analyses of those diaries to predict addiction in high school. Once we have the texts, we must identify some features that will be inserted into the model. We may use lower-level features such as patterns of letters or words (n-grams, which will be introduced in the next chapter), or more complex features such as personality dimensions measuring dependency, extraversion and so on. When using these features to predict addiction, we may find that some of them contribute nothing to the model and therefore should be removed. Other features that we haven't previously considered may surprisingly be revealed as the magic bullets of our model. The bottom line is that a pragmatic approach to automatic personality analysis optimally combines openness to different theoretical approaches and the decisiveness to choose only those features that empirically contribute to the model, given a specific task. With this approach in mind, we may move on to the next chapter, where we delve deeper into the field of computational personality analysis.

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