WENET

INTERNET OF US

D1.1 EARLY TAXONOMY OF DIVERSITY

Revision: v.0.2

Work package	WP 1
Task	Task 1.1
Due date	01/07/2019
Submission date	03/07/2019
Deliverable lead	UNITN-SOCIOLOGY & LSE
Version	0.2
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Abstract	In this document, we have outlined an overview of the notion of diversity in terms of scientific enquiry and within the social scientific literature. The aim of this document is to show how complex the concept is and what challenges exist in operationalizing such an abstract theoretical construct. The document is structured in the following way: First, we start with a theoretical section about the different kinds of diversity, variation and level of conceptualizing both. Second, we present common quantitative methods used to capture diversity that are used across disciplines. Third, we outline

	how the notion of social practice could represent the key to operationalise the diversity-aware platform that is among the object of the project WENET.
Keywords	Diversity, measurement, social science, social practices

Document Revision History

Version	Date	Description of change	List of contributor(s)
V0.2			

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Co-funded by the Horizon 2020
Framework Programme of the European Union

EXECUTIVE SUMMARY

In this document, we have outlined an overview of the notion of diversity in terms of scientific enquiry and within the social scientific literature. The aim of this document is to show how complex the concept is and what challenges exist in operationalizing such type of abstract theoretical construct. The document is structured in the following way: first, we start with a theoretical section about the different kinds of diversity, variation and level of conceptualizing both; second, we present common quantitative methods used to capture diversity that are used across disciplines. Third, we outline how the notion of social practice could represent the key to operationalise the diversity-aware platform that is among the object of the project WENET.

In particular, we present an overview of:

➡ The concept of diversity. We distinguish between:

- Diversity within a type, or **variation**. This refers to differences in the amount of some attribute or characteristic, such as the height of giraffes.

- Diversity of **types and kinds**, or species in biological systems. This refers to differences in kind, such as the different types of foods kept in a refrigerator.

- Diversity of **composition**. This refers to differences in how the types are arranged. Examples include recipes and molecules.

➡ Measures of diversity in scientific enquiry. We differentiate among five types of measures: *variation, entropy, distance, attribute*, and *population measures*. These five types of measures can be placed in the three categories described earlier.

- Diversity within a Type: *Variation*

- Diversity across Types: Entropy, Distance, Attribute

- Diversity of Community Composition: *Population*

➡ The notion of culture and cultural diversity and its problematic definition in social scientific research. In other words, culture can be considered as *a latent variable (or alternatively as independent variable)* that influences people, their attitudes and responses to relevant questionnaires, their values that find expression in everyday practices. Individuals receive this cultural baggage through socialization processes apply it relatively unproblematically. By contrary, recent studies represent *culture as fragmented in social groups and diverse in its manifestations* .The conception of culture affecting other aspects of beliefs, intent and collective life has been supplanted by an idea of culture as complex structures of quasi-rules that constitute resources that can be put into strategic use by people.

➡ We introduce the notion of 'habitus' and 'social practice'. In particular, practice theory is suggested as approach to tackle the issue of diversity. Practice theory approaches treat societal phenomena in a new way by focusing on the 'space' between individuals' activities and wider social structures, which is often ignored in more individualist or structuralist approaches. In a nutshell, practice theory: places the social in 'practices', and, that it treats practices as the 'smallest unit' of social analysis.

➜ We outline a potential and preliminary application of this operational definition and identification strategy of diversity that will be further developed in the following deliverable.

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1 EARLY TAXONOMY OF DIVERSITY

1.1 THE NOTION OF DIVERSITY IN SCIENTIFIC INQUIRY

When scientists speak of diversity, they can mean any of three characteristics of a population. They can mean *variation* in some attribute, such as differences in the length of finches' beaks. They can mean *diversity* of types, such as different types of stores in a mall. Or they can mean differences in *configuration*, such as different connections between atoms in a molecule.

To provide an example of the type of analysis that follows, we begin with an example of how diversity contributes to complexity in economics. Imagine an exchange market—a bazaar in which people bring wheelbarrows of goods to trade. This example demonstrates how diversity can reduce volatility in a system and also produce complexity. In an exchange market, diversity can enter in three ways: (1) in what the agents bring to buy and sell, their *endowments*; (2) in the agents' *preferences* for the different goods; and (3) in the ways the agents *adapt* to information, specifically prices.

If the market had no diversity, not much would happen. If everyone had identical endowments and preferences, then no one would have any reason to trade. So, we need diversity on at least one of these dimensions just to make the market come to life. Let's add diversity to both endowments and preferences so that agents bring different goods to market and desire different bundles of goods as well. In such a market, we need some mechanism for prices to form. Following standard economics, let's assume that there exists a market maker, who calls out prices with the intent of producing equilibrium trades.

There are many ways to characterize diversity. Each affect how much diversity we see in a particular situation. I may walk into a furniture store and see tremendous diversity in style. You may walk in and see no diversity at all—just a bunch of bedroom furniture. In this section, we describe several categorizations of types of diversity as well as some common measures of diversity.

One logical starting place for thinking about how to categorize diversity is to distinguish between continuous and discrete differences. The weights of the members of a murder of crows or of a parliament of owls vary. These differences in weight can take on any real value; hence we can think of them as a continuous variable. Alternatively, we can think of diversity as the number of types or as the distribution across those types. For example, to capture diversity, we might count the number and types of animals in a zoo or species in a rainforest. The two approaches, measuring variation in weight and counting the number of types, capture different types of diversity. Many of the populations that interest us will include mixtures of discrete and continuous differences. Bluebirds differ from cardinals, but among the cardinals there exist continuous differences. Some cardinals appear just a little redder than others.

Though logically clean, the continuous/discrete dichotomy approach doesn't accord with how people typically categorize diversity. Instead, people more often distinguish between differences within a type (*variation*) and differences across types (*diversity*). The notion of types will prove problematic, but people like to create types or categories. Doing so allows us to make sense of the barrage of stimuli coming at us. (It's a bird, it's a plane, it's Superman!) we should note that the within/across types categorization mostly agrees with the continuous/discrete categorization. The two disagree primarily in cases where the differences within a type are discrete, such as differences in colours of paint.

In this document, we will refer to diversity of *compositions* or arrangement. A washing machine and an airplane engine may contain many of the same parts, but they differ in assembly. Putting all of this together gives three types of diversity.[3]

- *Diversity within a type, or* **variation**. *This refers to differences in the amount of some attribute or characteristic, such as the height of giraffes*.
- Diversity of ***types*** *and* ***kinds**, or species in biological systems. This refers to differences in kind, such as the different types of foods kept in a refrigerator*.

- *Diversity of **composition**. This refers to differences in how the types are arranged. Examples include recipes and molecules.*

Figure 1 Variation: Diversity within a type

This trichotomy will prove helpful as we analyse the effects of diversity. Like most classifications, this one looks attractive if you don't think about it too deeply.

Variation

Diversity within a type, or variation, is often defined along dimensions, such as length, width, height, circumference, or colour. Suppose that you go on a scavenger hunt and find eight marbles. If you measure the diameters of those marbles, you would probably find that they are not all the same. They exhibit *variation* in their diameters.

Variation within a type plays important roles in the adaptability and robustness of complex systems. As we just mentioned, members of the same species exhibit variation in wing size and beak length, and those differences allow them to occupy distinct niches. Not only can the differences produce a fitness or survivability advantage for some members of that species, they also allow the species to adapt to a changing environment.

Figure 2 Diversity across types

Differences of Types

When people speak of diversity, they tend to mean differences of types. Suppose that instead we were asked to search your house for circular objects. You might find a frisbee, a pizza pan, a dinner plate, and a quarter. This collection would contain *diverse types* of objects even though they are all circular. These diverse circular objects have different functions. We could eat dinner off a frisbee, and you could play catch with a dinner plate, but neither would be much fun. The functional differences between quarters and pizza pans are even more extreme. You could cook a pizza on a quarter, but it wouldn't be very filling. And, no matter how hard you tried, you couldn't load a parking meter with a pizza pan. These differences in functionalities make the world more complex.

1.2 MEASURING DIVERSITY: AN OVERVIEW

To move beyond loose, informal characterizations of diversity requires formal measures. Without measures, we can at best make qualitative comparisons. Any foray into measures obliges the reader to acquire notation, definitions, and subtle distinctions that may lack immediate context and lends an austerity to the text, but so be it. Our intent is not to discourage all but the most persistent readers, but to build a common vocabulary and basis of knowledge. Counting the number of types is the most obvious way to measure diversity. Ecologists refer to this as *species richness*. Types, though, may not be well defined, a point we return to later.

Often, we'll be interested in the distribution across the types or the relative sizes of those types. Economists are interested less in the number of firms in a market than in their market shares. And ecologists care as much about *species abundance,* the distribution of species' population sizes, as they do about the number of species. Therefore, we need to do more than count the number of types, so we need multiple measures of diversity.

Over the past half-century, statisticians, ecologists, computer scientists, and economists have proposed a variety of diversity measures. In what follows, we differentiate among five types of measures: *variation, entropy, distance, attribute*, and *population measures*. These five types of measures can be placed in the three categories described earlier.

- Diversity within a Type: *Variation*

- Diversity across Types: *Entropy, Distance, Attribute*

- Diversity of Community Composition: *Population*

Before diving into notation and definitions, we make three observations about measures in general and diversity measures in particular. First, measures can be constructed from the ground up by experimenting with mathematical formulae, or they can be derived analytically from a list of desiderata. Though the latter approach might appear more scientific, in practice the two approaches prove more alike than different. Most intuitive measures can be shown to satisfy desirable axioms. If they didn't, the measures wouldn't make sense or function empirically.

Second, *diversity measures compress information.* They transform populations of diverse entities into single numbers. In the process, meaningful distinctions disappear information gets lost in the translation. For each of the measures we describe, with a little mathematical effort anyone can construct populations that differ substantially yet yield the same diversity value. For example, you might show that the diversity of Microsoft Word fonts equals the diversity of deciduous trees in Trentino. This may seem like a goofy exercise, but such calculations reveal a cost of information compression. A regression that uses diversity as an independent variable treats fonts and trees identically. Ecologists seeking empirical relationships between diversity and some functional characteristic like ecosystem robustness, therefore, cannot help but place radically different ecosystems in the same box.

Finally, diversity measures can be applied to cultures, languages, makes of automobiles, ecosystems, and even toothbrushes. Each of these sets of types has distinct properties. One size can't fit all, owing to the relationships between entities. For example, bird species have genetic lineages. Measures of bird diversity can exploit that branching structure. Those same measures may not work for breakfast cereals, which lack genetic history, and therefore cannot be arranged in a branching network. This is not to deny that one could identify some parental lineages in cereal, such as when Corn Flakes begat Frosted Flakes. But, unlike birds, new cereals can arise without having parents. Thus, we will need more than one measure.

The multiplicity of measures allows us to pick the one that fits the context. It also gives us multiple lenses to view the same data, adding to our collective understanding. Stirling (2007) shows how these lenses are related, how they can be placed within a general framework.

The first type of measure, *variation measures*, should be familiar to most readers. These measures capture diversity along a single numerical attribute such as beak length or income within a type. The most common measures of this type are *variance* and its square root, *standard deviation.*

The second type of measure, *entropy measures*, capture distributions across types. These measures often depend on both the number of types and the evenness of the distribution across those types. A basket with ten oranges, ten apples, and ten bananas would be thought by most people to be more diverse than a basket with twenty-nine apples and one orange. Entropy measures capture the fact that the first basket has more types (three to two) and that its distribution across those types is more even. Entropy measures come from a specific family

of measures. By changing a single parameter, we can vary the weight that an entropy measure places on the number of types relative to the weight it places on the distribution across those types. In the formal construction that follows, the parameter α equals the power to which the probabilities of the different types are raised. Thus, when $\alpha = 0$ the measure equals the number of types.

Entropy measures also have the property that sets containing equal numbers of N types have an entropy equal to N. Within the family of generalized entropy measures, one particular measure known as Shannon's entropy (the limit as α approaches 1) satisfies a list of desiderata one might compile for a diversity measure. For this reason, ecologists, computer scientists, information scientists, physicists, and some economists use Shannon's measure. A downside to Shannon's entropy is that it requires the use of logarithms which are neither easy to compute nor intuitive. For that reason, a diversity measure with $\alpha = 2$ may be the most commonly used measure. This measure has various names—as discussed below—depending on the discipline. In each of these disciplines, the diversity measure serves as a benchmark for more nuanced analysis. For example, studies of political competition consider the ideological breadth of the parties as well as their effective number (Grzymala-Busse 2007).

For all their benefits, entropy measures have what some see as a large flaw. They do not take into account the extent of the differences between the types. The entropy of a basket with ten apples, ten bananas, and ten oranges exceeds the entropy of a basket with eleven apples, ten iguanas, and nine orchids because the first basket has a more even distribution. Entropy measures don't capture the fact that iguanas and orchids differ from apples much more than do oranges and bananas. As difficult as comparing apples and oranges may be, comparing oranges and iguanas must be even harder. And for that reason, two types of measures have been constructed that take type level differences into account.

The first type of measure that takes into account differences we shall call *distance measures.* One measure, due to Weitzman (1992), assumes a pre-existing *distance function* for pairs of types. If we use colour, growing region, and how they're consumed, the distance between an apple and an orange equals three: they differ in colour, in the regions in which they grow, and in whether they must be peeled. Using these dimensions, the distance between an orange and a banana would equal two. To calculate the distance between an iguana and an orange, we would need more dimensions. That distance, by the way, would be pretty large, certainly bigger than two. For some classes of types, distance functions exist in the literature and have wide acceptance. As mentioned, in biological contexts, distance can be measured phylogenetically. For other classes of types, such as human minds or art, no natural distance function may exist. Given a distance function, a naive way to measure diversity would be to be to add up all of the distances between the members of the set. This approach has several flaws. Most notably, it would increase diversity whenever types are added to the set. A set containing ten apples and one orange would have a total distance between all types equal to ten times two (the distance from an apple to an orange), or twenty. Adding an eleventh apple wouldn't make the set more diverse, yet it would increase the total distance to twenty-two.

The second approach that takes into account type level differences relies on attributes. These *attribute measures* identify the attributes of each type in the set and then count up the total number of unique attributes. In some cases, the number of distinct attributes captures diversity better than does the number of types. Imagine a geeky professor sporting a pocket protector containing four pens: two blue pens with blue caps and two red pens with red caps. The set of two copies of two pens has a type diversity of two. Suppose that the professor mistakenly places a red cap on a blue pen and vice versa. Now he has four unique pens, which has diversity equal to four. Diversity has increased. Yet has it? If we instead count the attributes: two red pen bases, two blue pen bases, two red caps, and two blue caps, the diversity equals four regardless of the assignment of caps to bases.

The final type of diversity measure considers *disjoint populations*. These measures capture differences between sets of types, whereas all of the previous measures consider the diversity of a single set. Population measures enable scientists to determine changes in composition. These measures can capture sensitivity to initial conditions, path dependence, and the stochasticity of processes.

Before digging into the definitions, we digress a moment on the notion of a type. In thinking about types, a good place to start is with the distinction between *taxonomies* and *typologies*. A taxonomy classifies objects or things based on a hierarchy. In biology, linguistics, and other fields, origins determine that hierarchy. A typology classifies those same things by their attributes. A taxonomic classification of English words places words borrowed from French near each other, whereas a typological classification places nouns with nouns and adjectives with adjectives. A biologist who studies birds might specialize on related species. This would be a taxonomic approach. Or, that biologist might study all birds found in a particular area. That would be a typologic approach. We could think that taxonomic and feature-based typological classifications of species would be nearly identical, that if two butterflies looked identical, they would be genetically identical. That's not true. A good number of species of snakes, birds, and salamanders possess similar attributes but have distinct phylogenies. Biologists refer to these as *cryptic species*. Species are a kind of type, and as is true for most types, the boundaries of species become blurry. For example, a plunge into the biology literature reveals notions of species to be contested on several fronts. Textbooks in biology define a species as a population or set of populations capable of interbreeding and producing fertile offspring. This basic definition leaves some wiggle room for interpretation and second-guessing.

Characterizing the equivalent of species in the worlds of products and ideas is even more problematic. What constitutes a "species," or type, in the world of ideas is determined through decentralized processes involving historians, marketers, artists, patent lawyers, and governments. *It's accurate to say that types are socially constructed, politically constructed, and economically constructed.*

Nowhere is social construction more widespread than in the typing of humans. Consider the notion of race. Standard categories of race do not match one to one with genetics. Even more troubling, self-reported conceptions of race often differ from the races that people internally feel themselves to be, and from the races that others perceive them to be. And, even if we were to buy into the notion that there are, say, five races, how do we count multiracial people? Do we count each unique fractional representation of races as a separate new race? Or do we count all multiracial people as a sixth race and systematically understate the diversity of a population?

Moving back to the more general discussion of what a type is, it is probably not too much of a reach to say that the definition of types depends upon the question being asked. A candy store that sells thousands of types of candy can be thought of as selling either one type of good—candy—or, if we distinguish among the many brands and varieties, thousands of types. Whether we differentiate between a Twix and a Mars depends on whether we're interested in the diversity of individual choices (in which case we do) or how economic diversity drives macro-economic growth (in which case we do not).

Many common categories, like the cloud categories, are based on exemplars. When someone mentions the word "muffin," our minds invoke a typical instantiation of a muffin. And we tend to identify other things as muffins if they are similar to the image we invoked. If we are asked about a chair, child's wagon, or glass of water, we do not think of attributes: "*chair*: supporting structure (usually four legs), seat, and a back (typically); *child's wagon*: red, metal, four-wheeled vehicle of length three feet and height eighteen inches with sides but not a top, and a handle; *glass of water*: collection of molecules containing two hydrogen atoms and one oxygen atom at a temperature between zero and one hundred degrees Celsius." Instead, we picture in our mind a prototypical chair, wagon, or glass of water.

Our preferences often drive our categorizations. What matters to each of us differs. Thus, we differ in what we consider to be a type. One person's piece of tile is another person's green, Pewabic, craftsman tile. Furthermore, the less consensus on the functional consequences, the more likely that we will disagree on the set of types. People who love meat classify cuts of beef by their location on the steer. People on diets may classify those same cuts of meat by how many calories they have per ounce. And, people on tight budgets classify them by price per pound. Here, diversity of preferences begets diversity of types.

Type classifications also depend on expertise. All else equal, the more experience or interest we have in a particular area, the greater our ability to refine the set of types. A typical middle-aged European may classify music into six types: jazz, classical, rock, blues, pop and folk. A musician may have upwards of twenty classifications for jazz alone. If asked about a dresser, many people might think of two prototypes: a tall four- or five-drawer dresser and a shorter, wider dresser with two sets of drawers and perhaps a mirror. A furniture designer will invoke many more prototypes based on style, era, and function.

These caveats aside, we will now describe formal measures of diversity. From here on, we consider how types form rather than engage in semantics over what is a type. We try to avoid subtleties and choose categories with rather thick boundaries.

1.2.1 Measures of Diversity

It is now time to introduce formal definitions. In what follows, we rely on the following notation:

$i \in \{1, 2, \ldots, N\}$ denotes the **types** in the population.

m_i denotes the **number of type** in the population. The total population is of size

$$M = \sum_{i=1}^{N} m_i.$$

$$p_i = \frac{m_i}{M}$$ denotes i's **proportion** in the population.

$d(i, j)$ denotes the **distance** between type i and j.

$a \in \{1, \ldots, A\}$ denotes the **attributes** in the population.

Throughout, we assume proportions with respect to number and not some other measure, such as biomass or cost. We do this for expository clarity, not because it always makes sense to do so. When computing the diversity of an ecosystem, proportion of biomass has greater relevance. The number of termites can vastly exceed the number of elephants yet have approximately the same biomass.

Variation Measures

The first type of measures, *variation measures*, apply to differences in measurements of an attribute within a given type. Variation measures receive substantial coverage in statistics textbooks, so I offer only a brief treatment here. Variation is measured within a population. That population might be elephant seals, and the attribute under consideration could be their flippers or brains. Within the population of elephant seals, flipper sizes and brain sizes vary. To capture variation, statisticians rely on two related measures: *variance* and the *coefficient of variation*.

Measures of Variation

Let $x_1, x_2, \ldots, x_m$ denote the values of an attribute among the members of a type. Let $\mu = \frac{1}{m}(x_1 + x_2 + \ldots + x_m)$ equal the mean of the attribute values.

The variance of the values, σ^2, equals the average squared distance from a point to the mean:

$$\sigma^2 = \sum_{i=1}^{m} \frac{(x_i - \mu)^2}{m}.$$

The coefficient of variation equals the square root of the variance (the standard deviation) divided by the mean:

$$c_v = \frac{\sigma}{\mu}.$$

Though these measures have similar forms, they differ in how they characterize maximal diversity. To maximize variance, values must be bunched at the extremes. To maximize the coefficient of variation, the mean must be small. Thus, if one attribute has a high value and all the others have low values, the coefficient of variation will be large. The coefficient of variation measure does not satisfy symmetry: if one variable has a low value and the rest have high values, the coefficient takes on a relatively low value because the mean is high.

These technical details become relevant when applying these measures to a particular domain (Harrison and Klein 2007). Consider the claim that increasing the variation in attribute values makes a population better able to adapt to a changing environment. That claim would hold as the population moved from low variation (all attribute values the same) to moderate variation (many distinct attribute values), but it probably would not hold as variation increased from moderate to maximal. Recall that the distribution that maximizes variation implies only extreme values. Successful adaptation probably requires a distribution that includes intermediate values as well.

Entropy Measures

Entropy measures consider the number of types and the distribution across those types. Entropy measures map probability distributions over types into real numbers. To describe entropy measures, we begin by describing three desiderata, written as axioms, that we might want a diversity measure to satisfy. It can be shown that Shannon's entropy uniquely satisfies those desiderata among continuous functions. We then describe a family of entropy measures indexed by a single parameter for which Shannon's entropy, as well as several other common measures, are special cases. By convention, entropy measures are written H_N, where N denotes the number of types.

The first desideratum states that the measure satisfies a *symmetry* condition on proportions, that is, the diversity of the proportions (0.3, 0.4, 0.3) should be equal to the diversity of the proportions (0.4, 0.3, 0.3). In other words, it does not matter which type is in which proportion. A basket with six apples and five oranges has the same entropy as a basket with five apples and six oranges.

Symmetry: *The value of the function H_N does not change if the types are renumbered; i.e.,* $H_N(p_1, p_2, \ldots, p_N) = H_N(p_2, p_1, \ldots, p_N)$.

The second desideratum says that diversity is maximized when types exist in equal proportions.

Maximum at Equality: *The function H_N is maximized for N types when* $p_i = \frac{1}{N}$ *for all i.*

The third desideratum applies to decompositions of types into subtypes. Consider a set containing three types of flora and two types of fauna. We could compute the diversity over all five types—*total diversity*. We could compute diversity at the level of flora and fauna—*between category diversity*. We could also compute the diversity within the flora and fauna categories—*within category diversity*. The third desideratum requires that total diversity equals between category diversity plus within category diversity. Writing this formally requires additional notation. Let K denote the number of categories, and B the number of types within each category.

Decomposability: *Assume N types that can be placed in K categories, each containing B types (note: N = B · K). Denote the probability of category j by q_j and the probability of each type by $p_{j\ell}$, where j denotes its category and ℓ the type within that category. The functions H_N, H_K, and H_B satisfy*

$H_N(p_{11}, p_{12}, p_1B, \ldots, pKB) = H_K(q_1, q_2, \ldots, q_K)$

$$+ \sum_{i=1}^{K} q_k H_B \left(\frac{p_{k1}}{q_k}, \frac{p_{k2}}{q_k}, \ldots, \frac{p_{kB}}{q_k} \right)$$

The *Entropy theorem* states that a unique functional form, up to parameter choices, satisfies these three desiderata. Any continuous function that satisfies *symmetry, maximum at equality*, and *decomposability* has the following functional form:

$$H_N(p_1, p_2, \ldots, p_N) = -C \sum_{i=1}^{N} p_i \log_b(p_i),$$

where C is a positive constant and b equals the base of the logarithm. When $C = 1$ and $b = 2$, the formula gives information entropy. The entropy measures belong to a larger class known as *generalized entropy functions*. The class also contains more intuitive and easily calculated functions.

The class of **generalized entropy functions** can be written as follows:

$$G_N^\alpha(p_1, p_2, \ldots, p_N) = \left(\sum_{i=1}^{N} p_i^\alpha \right)^{\frac{1}{1-\alpha}}.$$

The following are special cases:
Number of Types ($\alpha = 0$):

$$G_N^0(p_1, p_2, \ldots, p_N) = N$$

Diversity Index ($\alpha = 2$):

$$G_N^2(p_1, p_2, \ldots, p_N) = \left(\sum_{i=1}^{N} p_i^2 \right)^{-1}$$

Most Abundant Type ($\alpha \to \infty$):

$$G_N^\infty(p_1, p_2, \ldots, p_N) = \frac{1}{p^*}, \qquad \text{where } p^* = \max_i p_i$$

Shannon Entropy ($\alpha \to 1$):

$$G_N^\alpha(p_1, p_2, \ldots, p_N) = -C \sum_{i=1}^{N} p_i \log_e(p_i)$$

Notice that for every generalized entropy function, the entropy of an equal distribution across the number of types equals the number of types:

$$G_N^\alpha \left(\frac{1}{N}, \frac{1}{N}, \ldots, \frac{1}{N} \right) = N.$$

The simplest entropy measure is the number of types ($\alpha = 0$). Unfortunately, the number of types does not capture what people often mean by diversity. The distribution across the types also matters. A group with ten men and ten women has more gender diversity than a group with nineteen men and one woman.

The case $\alpha = 2$, what we will call the **diversity index**, is the most common measure of diversity. This measure, or its inverse, appears in the literature under various names: *Herfindahl index* (economics), *effective number of parties* (political science), and (almost) *Simpson's index* (ecology).

Comparing functions within the class of generalized entropy functions can help give intuition for what Shannon entropy captures. For large α, generalized entropy places relatively more weight on the more probable types. In the limit as α approaches infinity, it places all of the weight on the most probable type. For α equals two, the measure weights proportions by their proportions. By that we mean that it multiplies proportion p_i by itself. As a result, the inverse of the diversity index equals the probability that two randomly selected members of the population

will be of the same type. For α approaching zero, the entropy measure counts the types. Shannon entropy corresponds to the limit as α approaches one, so we can infer that Shannon entropy places slightly more than proportional weight on unlikely outcomes and slightly less than proportional weight on likely outcomes.

Distance Measures
As already mentioned, entropy measures fail to take into account the extent of differences between the types. We next present a diversity measure proposed by Weitzman (1992). This measure is designed to capture diversity in terms of distance. You can think of all of the entities connected in a giant network and the distance between two entities as how many links (branches) you must traverse to get from one to the other. Here, I restrict the domain to types arranged in a rooted tree network. Weitzman's measure applies more generally but, in effect, it always creates a rooted tree. For ease of presentation, I assume the types lie at the ends of branches in the network. The network has $L + 1$ levels, with the ends of the branches being level 0 and the root being level L. For a given type, define its *ancestors* to be all nodes that lie above it in the network. In the Figure 2.1, I show a four-level network and denote the ancestors of type *a* with solid dots.
The distance between type *a* and type *c* equals the *lowest level* at which *a* and *c* have a common ancestor. In the example above, that distance equals two.

Figure 3 Levels
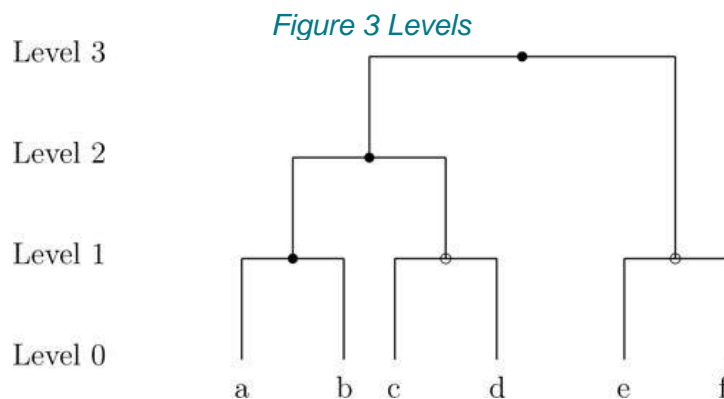
The Weitzman diversity, $W(S)$, of a of set of types given a distance function $d(i, j)$ is constructed recursively as follows:
- Step 1: Let *S* equal the empty set and set $W(S) = 0$
- Step 2: Randomly choose a type to add to *S*
- Step 3: Choose a type *j* of least distance to a member of *S* according to $d(\cdot, \cdot)$
  - Increase $W(S)$ by the distance from *j* to *S*
  - Add type *j* to the set *S*
- Step 4: If not all types belong to *S* go to Step 2

To compute the Weitzman diversity in the example given in the previous figure with levels 0 through 3, the algorithm begins with a random type, *a*, and sets *W* equal to zero. The set *S*, therefore, equals the singleton {*a*}. The algorithm then chooses the type closest to *a*, which is *b*, increments *W* by $d(a, b) = 1$, and adds *b* to the set *S*. The algorithm then chooses a type closest to the set $S = \{a, b\}$. This type could be either *c* or *d*. The distance from either *c* or *d* to each member of *S* equals two, so *W* increases to 3. Suppose that the next type chosen is *c*. The diversity of the set *S* can be written as $W(a, b, c) = 3$. Next, the algorithm chooses *d*. Its distance to the set *S* equals one (its distance to *c*), so $W(a, b, c, d) = 4$. Next, *e* (or *f*) is added, and its distance to *S* equals 3. Finally, *f* is added to the set. Its distance to the set equals one, because $d(e, f) = 1$. Therefore, the Weitzman diversity of the set, $W(\{a, b, c, d, e, f\})$, equals eight.
Weitzman diversity has several nice properties. The measure can capture the impact of type or species loss. The decrease in diversity from a loss of a single type equals the least distance from that type to some other type. Loss of a type that differs significantly from other types, such

as a species that occupies its own trophic level, results in a large loss of diversity. A similar logic implies that the time required to reproduce a lost species through mutation correlates with distance in the tree. Species that branched off earlier would be more difficult to reproduce. And yet, the measure is not perfect. In some cases, no natural distance measure between the types may exist. In that case, Weitzman diversity cannot be computed. In other cases, a graph of the set of distances may not produce a network that looks like a tree. In the latter cases, Weitzman diversity can still be calculated, but its value need not be unique.

Attribute Measures
As an alternative to Weitzman diversity, several scholars have proposed diversity measures based on attributes. The simplest measure, what I call *attribute diversity*, adds up the number of unique attributes represented in the population. The formula weights all attributes equally. Some attributes, such as the ability to fly, may be more valuable than others. To capture variations in importance of attributes, the *weighted attribute diversity measure* allows for individual weights to be assigned to the attributes.

The Attribute Diversity, $\mathcal{A}$, of a set S equals the number of distinct attributes present in the population of types.

Given a type i, let $A(i)$ denote the attributes expressed by type i:

$$\mathcal{A}(S) = \left| \bigcup_{i \in S} A(i) \right|.$$

The Weighted Attribute Diversity, $\mathcal{WA}$, of a set S equals the weighted average of the distinct attributes present in the population of types according to a vector of positive weights $\lambda = (\lambda_1, \lambda_2, \ldots, \lambda_A)$, where $\sum_{a=1}^{A} \lambda_a = 1$,

$$\mathcal{WA}(S) = \sum_{a \in \cup_i A(i)} \lambda_a.$$

Before discussing these two measures of diversity, I make a distinction between *measures* of diversity and *valuations* of diversity. Suppose that the weights on attributes, λ, originate from some objective criterion, such as the average distance from that attribute to all others. If so, then weighted attribute diversity can be interpreted as a measure. Alternatively, the weights might come from preferences. In considering the value of species, people might value warm, cuddly attributes more than sharp, fierce attributes. In this case, weighted attribute diversity should be interpreted as a *value* function, not a diversity measure.

The relevance of attribute diversity measures hinges on the *transferability* of attributes and the *separability* of their functions. In economic contexts, attributes can be transferred from one type to another at low cost. Bluetooth technology can be transferred from a computer to a car to a tractor at low cost. The same cannot be said of the attribute "breathing through a hole in the top of your head." Dolphins can do it. Humans, try as they might, cannot adopt the attribute. Given that traits cannot be transferred in ecosystems, saving a trait has greater value in an ecosystem than it does in an economy. As a result, ecologists care more about preserving species than traits.

To see this more vividly, consider attributes as sets of skills possessed by people in an economy. Two of those skills might be the ability to start a fire using only flint and some straw; another might be to build a shelter. If stranded in a chilly forest, the group doesn't care who among them possesses those skills so long as someone in the collective does. In contrast, a person in need of an appendectomy prefers that the skill package (*good hand-eye coordination, sound judgment, medical knowledge*) resides in a single person rather than be spread among people. In the former case, the skills are separable. In the latter case, they are not. Adding up attributes makes more sense the more separable the attributes' functionalities.

Disjoint Population Measures

Each of the diversity measures I have discussed so far considers a single population. We might also want to measure the difference between two populations. Disjoint population measures apply to pairs of sets of types. The first measure, the *joint number of types*, equals the number of unique species if the two sets are combined. The second measure, the *number of non-overlapping types*, equals the number of types that belong to exactly one of the two sets. Whittaker (1972) refers to the first as *beta* diversity and the latter as *gamma* diversity. The measures I cover rely only on the number of types, but attributes-based measures could be constructed along similar lines.

Given two sets of types, S_1 and S_2, let the Joint Number of Types equal the total number of unique types in the two sets:

$$\mathcal{J}(S_1, S_2) = |S_1 \cup S_2|$$

Let the Number of Non-overlapping Types equal the total number of types that belong to a

$$\mathcal{NV}(S_1, S_2) = |S_1 \cup S_2| - |S_1 \cap S_2|$$

single one of the sets:

These measures can be used to capture differences between ecosystems (or economies). If we hold the number of types in each set—for example, in an ecosystem or an economy—constant, an increase in the *joint number of types* corresponds to an increase in the *number of non-overlapping types*.

1.3 FROM DIVERSITY MEASURES TO SEGMENTATION

These formal measures of diversity prove useful in both empirical and theoretical investigations. Empirical tests that diversity has some effect require a characterization of diversity. The existence of multiple measures for diversity enables researchers to choose the measure that best captures the relevant diversity—does the effect depend on the number of types or on the distribution of types? Sometimes the choice of measure, in particular the widespread use of the *diversity index*, may owe as much to precedent as it does to logic.
How diversity gets measured in practice depends on the question being asked. In a market, the government may care about the level of competition, and a sociologist may care more about the set of available choices. The measure used also depends on available data. Scientists may be able to identify the number of firms or the number of species but getting measures of the distribution may be difficult. Moreover, which variable to use to measure proportions may not be obvious.

Segmentation and Profiling
In contemporary societies, segmentation of a population is crucial because more and more policies as much as products are aimed at subgroups of a given population and not necessarily to everyone. Moreover, the empirical relationship between variability in human populations and different patterns of behaviour, opinions and consumption patterns led to a long history of segmentation techniques. Examples of different bases of segmentation are based on these different attributes:

- Geographic

- Demographic

- Psychological

- Psychographic

- Sociocultural

And more recently, based on dynamic attributes also:

- Use-Related

- Usage-Situation

- Benefit Sought

- Hybrid

Table 1 and 2 provide some example of the segmentation variables that are measured and collected about individuals in order to carry out each segmentation bases. So, for example, common psychological segmentation used in all sorts of research can be based on personality traits, attitudes towards a given issue, people's needs or motivation. While a common sociocultural segmentation is one based on religion, social class, lifestyles, and more.

Table 1 Examples of different segmentations' bases and related variables 1

SEGMENTATION BASE	SELECTED SEGMENTATION VARIABLES
Geographic Segmentation	
Region	Piedmont, Trentino Alto Adige, Lombardy, Apulia
City Size	Major metropolitan areas, small cities, towns
Density of area	Urban, suburban, exurban, rural
Climate	Temperate, hot, humid, rainy
Demographic Segmentation	
Age	Under 12, 12-17, 18-34, 35-49, 50-64, 65-74, 75-99, 100+
Sex	Male, female
Marital status	Single, married, divorced, living together, widowed
Income	Under €25,000, €25,000-€34,999, €35,000-€49,999, €50,000-€74,999, €75,000-€99,999, €100,000 and over
Education	Some high school, high school graduate, some college, college graduate, postgraduate
Occupation	Professional, blue-collar, white-collar, agricultural, military..

Table 2 Examples of different segmentations' bases and related variables 2

SEGMENTATION BASE	SELECTED SEGMENTATION VARIABLES
Psychological Segmentation	
Needs-motivation	**Shelter, safety, security, affection, sense of self-worth**
Personality	**Extroverts, novelty seeker, aggressive, innovators**
Perception	**Low-risk, moderate-risk, high-risk**
Learning-involvement	**Low-involvement, high-involvement**
Attitudes	**Positive attitude, negative attitude**
Psychographic	
(Lifestyle) Segmentation	**Economy-minded, couch potatoes, outdoors enthusiasts, status seekers**
Sociocultural Segmentation	
Cultures	**American, Italian, Chinese, Mexican, French, Pakistani**
Religion	**Catholic, Protestant, Jewish, Moslem, other**
Subcultures (Race/ethnic)	**African American, Caucasian, Asian, Hispanic**
Social class	**Lower, middle, upper**
Family life cycle	**Bachelors, young married, full nesters, empty nesters**

However, the most commonly named but also ill-defined one is cultural segmentation as a way to capture *cultural diversity*. The concept of culture has been at the centre of intense research and debate across the social sciences and in particular in psychology and sociology. In recent years, the common ground between psychology and sociology of culture has increased. This is due to the change in perspective on culture that has increased the complexity of the way social scientists conceptualize it. Only thirty years ago, most social scientists – and policy makers too - viewed culture as a kind of continuous canvas that enveloped (Swidler, 1986) in a complete and coherent way around social groups and contexts. In other words, culture was considered as *a latent variable (or alternatively as independent variable)* that influences people, their attitudes and responses to relevant questionnaires, their values that they found expression in everyday practices. Individuals receive this cultural baggage through socialization processes to apply it relatively unproblematically. A corollary of this position was that there was no reason to worry too much about the constructs used to study culture, since there were different ways of referring to this latent cultural structure. On the contrary, recent studies represent culture as fragmented in social groups and diverse in its manifestations ((Lizardo et al., 2016). The conception of culture affecting other aspects of beliefs, intent and collective life has been supplanted by an idea of culture as complex structures of quasi-rules that constitute resources that can be put into strategic use by people (Bourdieu 1990, Sewell 1992, Swidler 1986).

This change makes the study of culture much more complicated and potentially much more useful to policy makers. Once acknowledged that culture is 'fragmented' - that people's norms

may deviate from what the media represent as normal or that our unconscious images and discourses of a phenomenon may differ - it becomes crucial to identify units of cultural analysis and concentrate the attention on the relationships between them. In effect, our measures cease to be indicators of a latent variable (culture) and their relationship with culture becomes analogous to that of education, income and place of residence to social stratification: distinct phenomena, analytically linked to a common theoretical, the relationships between them are a matter of empirical investigation (D'Andrade 1997 observes similar trends in anthropology).

Likewise, once it is recognized that people behave as if they were using culture strategically, it follows that cultures in which people are socialized leave many opportunities for choice and variation. Thus, our attention is directed to ways in which different cultural frames or understandings can be situationalized (Cerulo, 2010, 2013). Addressing these problems requires more elaborate and contestable psychological assumptions than the cultural-latent variable.

One possible approach is to move from the notion of culture to the one of *practice*. This idea was already mentioned as one of the existing strategies of segmentation and one example is presented in Table 3.

Table 3 Use-practice based segmentation examples

SEGMENTATION BASE	SELECTED SEGMENTATION VARIABLES
PRACTICE-Situation Segmentation	
Time	Leisure, work, rush, morning, night
Objective	Personal, gift, snack, fun, achievement
Location	Home, work, friend's home, in-store
Person	Self, family members, friends, boss, peers
Incentives Segmentation	Convenience, social acceptance, long lasting, economy, value-for-the-money

Next, we move to consider additional problems when we focus on studying culture diversity.

1.4 THE PROBLEM OF OPERATIZING DIVERSITY IN RESEARCH

As discussed in previous sections, the notion of diversity hides a considerable complexity. It is an umbrella term for many different notions. In the social sciences, diversity is often the way we use to define ourselves from others, it's the way we use to choose friends, and/or activate relationships. We tend to associate and bind with others similar to ourselves. We are in homophilic relationships with others, that is we share common characteristics (beliefs, values, education, etc.) that make communication and relationship formation easier. Diversity, in this sense, is a boundary. The problem here is what is diversity? How can we harness diversity? And the main question, how can we recognize diversity? In other words, different from what?

As stated in the Wikipedia encyclopaedia: in sociology and political studies, diversity is the degree of differences in identifying features among the members of a purposefully defined group, such as any group difference based on the identity politics on: *sex, sexual orientation, gender & gender identity, age, generation, religion, philosophy, socioeconomic background, social class or caste, occupation, profession, education, culture, racial or ethnic classifications, ethnicity, language, dialect, nationality, political party affiliation, settlement, urban and rural habitation, intelligence, mental health, physical health & disability, physical abilities, personality, behaviour or attractiveness, genetic attributes, and veteran status.* (https://en.m.wikipedia.org/wiki/Diversity_(politics))

In a nutshell, it includes but is not limited to socio-eco-cultural groups' characteristics (e.g. *age, ethnicity, social class, income, gender, race, sexual orientation, geographical location, religious status*) but also to the personal characteristics and the life world of an individual (e.g. *educational background, marital status, parental status, physical abilities/qualities/appearance and work experiences as well as life history, knowledge, competence, values, beliefs, gender expression, etc.*).

While many, if not all, of these forms of diversity can also be a source of discrimination, they can also be a resource. In human social behaviour, discrimination consists of treatment of an individual or group, based on their actual or perceived membership in a certain group or social category, "in a way that is worse than the way people are usually treated". Therefore, discrimination is treatment or consideration of, or making a distinction towards, a person based on the group, class, or category to which the person is perceived to belong. These include age, colour, criminal record, height, disability, ethnicity, family status, gender identity, generation, genetic characteristics, marital status, nationality, race, religion, sex, and sexual orientation. And everyone has something of value to contribute to the equation at work.

While diversity, if harnessed in this second perspective, can improve the lives of individuals and groups up to the whole of society, diversity is such a broad concept that everything could be different, and this is useless in our perspective.

The aims of the WeNet project are to <u>empower machine mediated diversity-aware human interactions</u>. In a nutshell the ability to connect people across diversity dimensions (actually: leveraging them) in order to: (a) help them achieve everyday life goals is the main distinguishing factor of the platform; (b) focus on specific complex tasks (e.g. asking for help in solving residency administration), for which users are navigating within different realms of diversity (competence, experience, language, culture).

The objective of the WP1 team includes the following research goals:
- Development of a <u>computational sociological theory</u> of **diversity**.
- <u>Mapping behavioural patterns</u> along a set of diversity dimensions (e.g., gender and demographics, culture), and
- <u>Building a computational model</u> thereof.

Furthermore, the team will evaluate the change of students' participation, behaviour, interaction using scientific measures that relate to individual users as well as groups by evaluating:

- 1. the degree to <u>which students use and participate</u> with WeNet tools (how often they participate, with how many people and groups).
- 2. the value to using WeNet tools, measured in terms of behaviour (e.g., <u>developing and maintaining healthy habits, quality of communication between students</u>).
- 3.the degree to which students cross group boundaries in their interactions (e.g., <u>building teams with students from other groups</u>).
- 4. subjective experience from using WeNet tools (e.g., satisfaction).

To complete all these tasks should we ask ourselves what kind of diversity we need? Here it is crucial to point out four main issues.

The first is to make a distinction between which type(s) of diversity can be leveraged to connect people through the dimensions of diversity and which type(s) cannot. In fact, we can think of diversity in two ways, as one of the actual factors of segmentation of society and individuals or as the intrinsic properties of the subject. The first case includes all those ascribable and acquisitive socio-demographic characteristics that allow a population to be segmented. Examples are gender, nationality ... etc. The second case covers all the experiences, skills, abilities and values that each subject develops and acquires during the course of their life. The first allow us to measure what is the level of inequality of a social system based on the distribution of resources and opportunities according to the segmentation examined. The latter, on the other hand, describes the degree of contribution that an individual can give to a community by making their skills available. In the first case these are given and at the most one can try is to correct them in terms of modifying distributions. In the second case, due to their nature, they can be exploited for the improvement of a given community in terms of interventions, potentially putting different individuals in contact but in a complementary way.

Consider the following example. What help can be given by knowing about gender, age, ethnicity, etc. in finding a person who can answer questions like:
- In which classroom is there a maths lesson?
- Am I looking for someone to drive me to the hospital?
- Is there anyone who can go to the pharmacy to get my medicine?
- Who's helping me organize the spring party?

Probably none. But on the other hand, if we know the competence, experience, culture of people this can help us to correctly connect those who have a need with those who can help to solve this need.

The second issue arises from the awareness that diversity is a multidimensional concept. For instance, in the power relations (e.g. economics) diversity is related to:

- **Ascribed characteristics** are those present at birth or assigned by others and over which an individual has little or no control. Examples include *sex, skin colour, eye shape, place of birth, sexuality, gender identity, parentage and social status of parents.*
- **Achieved characteristics** are those which we earn or choose; examples include *level of education, marital status, leadership status and other measures of merit.*

In most societies, an individual's social status diversity is a combination of *ascribed and achieved factors*. Moreover, diversity is <u>context sensitive</u>. What is diverse in one context is not different in another. Clear examples are the way in which the same *sexual orientation* (type of diversity) can assume a very different meaning of diversity depending on the different cultural context among countries and within the same community.

The third is that diversity, as well as its manifestation in inequality, is socially recognized. In this perspective the literature always associates diversity to culture. Culture is that which shapes us; it shapes our identity and influences our behaviour. Culture is our "way of being," more specifically, it refers to the shared language, beliefs, values, norms, behaviours, and

material objects that are passed down from one generation to the next. Diversity in the cultural perspective are traditions and customs, transmitted through learning and adaptations via Socialization and Enculturation process. Sociology, Anthropology and Psychology offer an explanation on human behaviour and in the society, they live and are interlinked in that they try to describe the different areas of human life and their relationships to each other. From the Sociological perspective culture consists of both material objects and abstract thoughts and behaviour. Several elements which sociologists consider in understanding culture diversity are language, norms, beliefs and values. From the psychological perspective sharing a culture means that people have a common way of viewing their relationship with the social and physical environment; of communicating their thoughts and emotions; of prioritizing their activities; of dividing tasks and resources; of attributing values, honours, and power. Finally, from an anthropological perspective explains cultural diversity through aspects of social life such as material culture, social organizations, politics, economics, symbolism, change and development, ethnicity and modern nation-state formation.

For instance, each country or community's unique cuisine can reflect its unique <u>history, lifestyle, values, and beliefs</u>. In brief, it reflects the **<u>culture and the cultural identity of the community</u>**.

Unfortunately, from a computational point of view, the concept of culture is a bit tricky.

1) The concept of culture is too vague, it's everything and nothing.
    - Culture is a complex system of behaviour, values, beliefs, traditions and artefacts, which is transmitted through generations.
    - Culture is a learned pattern of behaviour and is a way in which a person lives his life.
1) We can't observe culture we can observe its manifestations. We can define it theoretically, but we cannot measure it quantitatively. It is a latent concept.
2) Using only the explanation of culture, we can describe the diversity in the different cuisines, but not what is really different. Taste is only partly linked to culture.
3) If culture can grasp the meanings of eating, it does not consider all the other dimensions that form the entire process, the routine of food preparation. In fact, culture can' t capture the whole process, the times, the competences, the environment that make up the food preparation process.

In a nutshell, culture as well as diversity is too broad and too vague to be made operational. Culture is everything, and at the same time it does not embrace all the characteristics of the diversity in a society. Culture is distinct from social structural and economic aspects of society, but it is connected to them—both continuously informing them and being informed by them.

Therefore, in order to capture diversity, we must shift attention from the culture *itself* to its display, that is, to the parts that make up the cuisine, the behaviour of different social groups, their consumption patterns: *in brief their (social) practices.*

FIGURE 4 FIRE AND PANS

Remaining again on the food issue, a clear example is between the Western and Eastern cuisine. Here, cultural diversity is reflected not only in taste but also in the way food is cooked and consumed. As can be seen from the images in Figure 4, the cooking tools change and in *Figure 5* and *Figure 6*, the table Manners, the Dining Etiquettes and the tools for consuming food also change.

Figure 5 Table setting

Figure 6 Flatware

This is not only the results of a cultural process, but the result of a more complex process that Bourdieu (1977, 1990) names *habitus*. Habitus is ingrained habits, skills and dispositions. It is the way that individuals perceive the social world around them and react to it. These dispositions are usually shared by people with similar "cultural" backgrounds (such as social class, religion, nationality, ethnicity, education and profession). The habitus is acquired through imitation (mimesis) and is the reality that individuals are socialized, which includes their individual experience and opportunities. Thus, the habitus represents the way group culture and personal history shape the body and the mind; as a result, it shapes present social actions of an individual.

What this implies is that an agent's behaviour is governed by a combination of three factors:
- the habitus itself (that can be thought of as a general set of rules and dispositions defining the behaviour of a socially constituted group);
- the levels of economic, social and cultural capital the individual is endowed with (this is the general level of wealth, knowledge, culture and education possessed by the agent),
- and the field that the agent is operating in.

Bourdieu (1984, p. 101) reduces social practices to the following 'equation':

{(habitus) (capital)} + field = practice.

In Bourdieu's analysis (1984), taste is driven in part by the desire for distinction and peer group reference, and that gives rise to an explicitly evolutionary character to consumption patterns. "*Life-styles are … the systematic products of habitus, which, perceived in their mutual relations through the schemes of the habitus, become sign systems which are socially qualified. … The*

dialectic of conditions and habitus is the basis of an alchemy which transforms the distribution of capital, the balance sheet of a power relation, into a system of perceived differences, distinctive properties, that is, a distribution of symbolic capital, legitimate capital, whose objective truth is misrecognised." (Bourdieu, 1984, p.172).

A fourth issue is that individuals are not different in only one aspect but are different in a multiplicity of aspects that (inter)act all together. Unfortunately, the literature so far has preferred to focus on diversity by considering only single aspects of diversity – e.g. gender, sexual orientation, ethnicity, etc. – and not diversity from a holistic perspective.

This is mainly due to the fact that researchers follow the mainstream of research. The vast majority of social research has used <u>**variable-centered**</u> techniques to isolate the average relations between contextual factors, engagement, and other developmental outcomes. This atomistic focus on individual variables is inconsistent with the interactionist principle that no variables have "unique" effects divorced from other relevant operating factors (Bauer, Shannahan, 2007).

As point out Bauer and Shannahan (2007) "put simply, such models are "variable-centered," potentially failing to *capture the configurations of factors* that jointly explain *behavioral processes.*"

The reasons for these criticisms come from different perspectives but have as their common denominator the criticism of the rational choice model and a certain application of the methodological individualism that apply in a mechanical way the causality of the natural sciences to study social phenomena. Taking a narrative perspective, fAbbott (1992) argues that social reality happens in sequences of actions located within constraining or enabling structures. It is a matter of particular social actors, in *particular social places, at particular social times*. Our normal methods parse social reality into fixed entities with variable qualities. They attribute causality to the variables— hypostatized social characteristics — rather than to agents; *variables do things, not social actors*. Stories disappear.

And that is follows from a perspective of analytical sociology to Hedström (2005) *where causal explanations are not achieved by simply estimating parameters of generic statistical models, but by **developing evidence-based generative models** that explicate the mechanisms at work* (p.113).

The crucial point here is that (Manzo, 2014).
- no matter how carefully the variables entering a statistical model are chosen;
- no matter how resistant the structure of the model's estimates is to different model specifications;
- no matter how large the amount of outcome variability accounted for by the predictors' variability – the model's coefficients cannot provide a detailed representation of the entities, the activities, and the relations among those entities and activities that are likely to be responsible for the observed outcome(s).

Moreover, as states Fredricks (2015) the failure to consider the **diversity** of within-person profiles impedes our ability to design targeted intervention for specific groups. In a nutshell, in a context where it is essential to leverage diversity to connect people, without taking into account the entire complexity of the individual there is a high risk of failure.

The solution to these dilemmas is to move from a holistic perspective and thus from a variable-centric perspective to a person-centred/history-centred analysis. As an alternative, Bergman and Magnusson (1997) advocated the use of "**person-centered analyses**" that identify key patterns of values across variables, where the person, viewed holistically, is the unit of analysis.

The aims of <u>**person-centered analysis**</u> are to capture patterns of engagement *within* individuals <u>across time or contexts</u>.

A clear example of what it means to move to a person-centred perspective is pointed out by Modecki (2016). It is argued that the **Variable-centered** approaches assess which risk cognitions influence problem behaviour most strongly and whether relations differ by developmental age group (adolescents versus young adults); meanwhile the **Person-centered** approaches capture heterogeneity in patterns of cognitions among different age

groups. These distinct cognition patterns may **differentiate** <u>between adolescents</u> who display more (or less) problem behaviour.

Moving into a holistic perspective where the events are the focus of the analysis, opens a new and more flexible opportunity to model social interaction. Using the words of Abbot (1992) … once one moves beyond the simple world of action/response sequences to a world where <u>events have duration and overlap</u> … This means re-conceptualizing the behaviour of cases in the continuous variable space in terms of "trajectories" of "events." *Events are here defined as neighborhoods in continuous space, and narrative methods are justified because the vast majority of these neighborhoods are empty (see Abbott 1990b).*

To summarise this section, the question is which diversity do we want to leverage?

It is clear that diversity is an umbrella concept in the social sciences. So much so that there is no concept of diversity in the social sciences, everything is different. Gender, age, ethnicity, etc. are used to segment the population, they are useful for measuring the level of inequality in a given country or between countries, but these specific characteristics of the population are not useful for connecting people together, because they do not mean anything in themselves. Even culture, often used as an example of diversity, does not seem to be a useful concept. Theconcept of culture is too vague, it is everything and nothing. Culture is a complex system of behaviours, values, beliefs, traditions and artefacts, which is transmitted from generation to generation and is a learned pattern of behaviour, and is a way in which a person lives his or her life. The concept of culture can take in account the diversity in the different social activities both material and immaterial, but it cannot identify what is really different because culture can't capture the whole process, the times, the competences, the environment that make up the different social activity process. However, we can observe its manifestations.

Finally, the socio-demographic variables and in general the variable-centric approach to the definition of social groups is not effective to capture diversity. Here the diversity between these groups is not absolute but changes depending on the context. In short, there are no socio-demographic groups that differentiate, but there are contexts in which socio-demographic groups act in a different way. Moreover, this is not always true, but maychange according to policies, the economy, culture and even ethics within and between countries. In addition, the variable-centric approach does not capture processes, narratives, actions. This has the consequence that the diversity between social groups does not allow to see the diversity within the members of the same group.

The problem is therefore to go beyond gender, age, etc. to find what is common but at the same time different in each.

- Therefore, the focus must be shifted from social groups define in terms of socio-demographic characteristics to actors, events and persons.
- The focus must be on the knowledge, skills, abilities, behaviours, meanings, stories of individuals but also on the material and immaterial opportunities available to them: in a nutshell, on social practices.

If the main overall goal of WeNet is empower machine mediated diversity-aware human interactions then our aim must be to connect people across **diversity dimensions** in order to help them achieve everyday life goals, mainly to solve specific complex tasks**.** By diversity we mean: the skills, abilities, knowledge owned by a subject.

The interaction between two actors will be a product of their skills and needs and not on based on their socio-demographic characteristics or a list of such variables.

As such to grasp diversity, we need to shift the focus from groups to the actor's behaviour patterns (routines): in brief their (social) practices. But what are social practices?

FIGURE 7
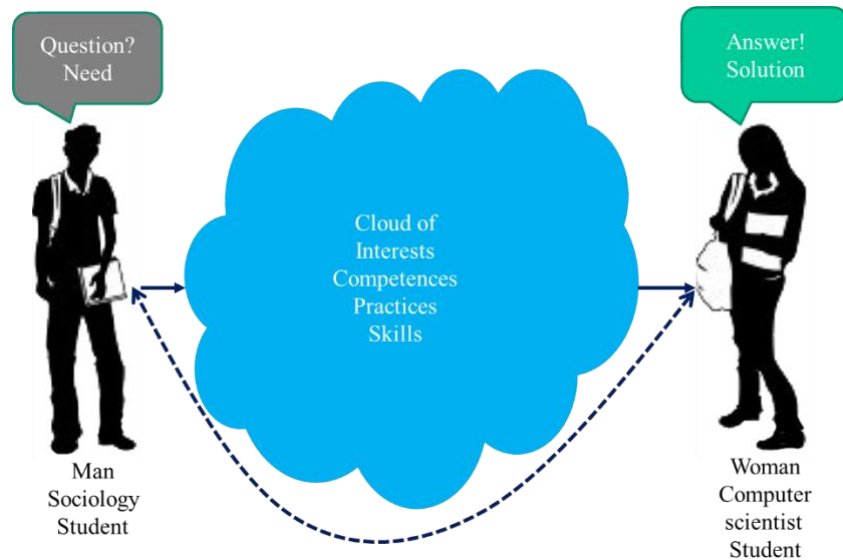
The interaction between two actors will be orchestrated on the basis of their skills and needs and not on the basis of their socio-demographic characteristics or a list of variables.

Then, to grasp diversity, we need to shift the focus from groups to the actor's behaviour patterns (routines): in brief their (social) practices. But what are social practices?

1.5 THE NOTION OF SOCIAL PRACTICES AS A KEY TO HARNESS DIVERSITY

meanings and norms implicit in [...] practices are not just in the minds of the actors but are out there in the practices themselves, practices which cannot be conceived as a set of individual actions, but which are essentially modes of social relations, of mutual action. (Taylor, 1971: 27)

the basic domain of study of the social sciences, according to the theory of structuration, is neither the experience of the individual actor, nor the existence of any form of social totality, but social practices ordered across space and time. (Giddens, 1984: 2)

As an answer to the issues briefly outlined in the previous chapter, we suggest that the problem be addressed differently through social practice theory. Now the question is: what is social practice theory and what are social practices?

For a very preliminary definition of what are social practices, we can say that "Social practices are routine behaviour like going to work, cooking and showering which integrate different kinds of elements, such as bodily activities, material artefacts, skills and associated meaning." (Holtz, 2013).

However, the answer is not straightforward as there does not exist a clear definition of social practice. This is due because practice theories are fed by different sources and disciplines and cannot yet be considered a unified, established theory. However, they are increasingly seen in empirical research and publications (Jonas et al., 2017, p.XV). A range of different approaches establish the foundations of a practice theory perspective (Schatzki et al, 2001), including thinkers such as Ludwig Wittgenstein (1958). Hubert Dreyfus (1991) contends that practices at once underlie subjects and objects, highlight non propositional knowledge, and illuminate the conditions of intelligibility. Anthony Giddens' structuration theory (1979, 1984), Pierre Bourdieu's theory of practice (1977,1984, 1990), Erving Goffman's frame analysis (1975) and Latour and Woolgar's (1986) case studies of actor–network theory talk of practices that free activity from the determining grasp of objectified social structures and systems, to question individual actions and their status as the building-blocks of social phenomena, and to transcend rigid action structure oppositions. Michel Foucault's concept of the technologies of the self (1976, 1980), and Jean-François Lyotard (1984, 1988), among others, speak of practices to depict language as discursive activity in opposition to structuralist, semiotic, and poststructuralist conceptions of structure, system, or abstract discourse.

Despite the heterogeneity (Reckwitz, 2002) within the field of practice theory, the unifying assumption is that societal phenomena (e.g., individual behaviour, collective activities, or sustainability processes) can be explained neither by methodological individualism (e.g., rational choice theory, sociological action theories) nor by structuralist or normativist approaches. A common element (Jonas et al., 2017, p.XV) in all these approaches is that they do not consider and explain human action and doings either primarily from an individualistic or primarily from a structural perspective. They seek instead to view doings as chains of actions and to analyse them from a perspective that incorporates both the opportunities for action open to the individual actors as well as the effects of socialised structures. A central concept in this respect is that of social practices.

For Jonas and Littig (2015) practice theories offer an alternative route to conceptualizing the dynamics of social change by addressing both the continuity and innovativeness of human behaviour. Much practice-theoretical research focuses on daily routines, that is, the everyday doings of people that are carried out with the aid of objects, such as tools, instruments, or the surrounding infrastructure. Since practices involve both physical and verbal activities, they need to be investigated using a mix of research methods, including interviews, observations, document analysis, and statistical data. Practice theories draw attention to core issues that frequently remain unaddressed by behavioural approaches, such as the role of large-scale infrastructure or material objects as participants in everyday life.

A clear example is the notion of practice of Bourdieu (1990). Bourdieu did not develop a consistent theory of practice over his works. Within his writings, (Shove et al. 2012) practices are more generally seen as a means of approaching his more central concern: that of theorizing *habitus* – a concept which in Bourdieu's hands embodies aspects of practical consciousness and of norms and rules of conduct, aspects that other theorists take to be part of practices themselves. Here it is habitus and practices which are in a recursive relation, such that habitus is 'constituted in practice and is always oriented towards practical functions' (1990: 52). However, it is this recursive relationship between habitus and practice that has become so interesting for our purpose. Firstly, because we can move from the specificity of the subject to a very special, sometime vague, social context: the habitus. Secondly, because we can go back to the subject from the arena of the relations (the habitus) throughy their practices.
As Bourdieu wrote:

The conditionings associated with a particular class of conditions of existence produce habitus, systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles which generate and organize practices and representations that can be objectively adapted to their outcomes without presupposing a conscious aiming at ends or an express mastery of the operations necessary in order to attain them. Objectively 'regulated' and 'regular' without being in any way the product of obedience to rules, they can be collectively orchestrated without being the product of the organizing action of a conductor. (Bourdieu, 1990, p.53)

In this perspective, the habitus is more than a context; it is what the members of a social system share among themselves and at the same time are immersed in. It is the way that individuals perceive the social world around them and react to it. It is the way to connect to each other. These dispositions are usually shared by people with similar backgrounds (such as social class, religion, nationality, ethnicity, education and profession). The habitus represents the way group culture and personal history shape the body and the mind; as a result, it shapes present social actions of an individual. The habitus consists "of both the hexis (the tendency to hold and use one's body in a certain way, such as posture and accent) and more abstract mental habits, schemes of perception, classification, appreciation, feeling, as well as action. (Bourdieu,1977). These schemes are not mere habits: Bourdieu suggested they allow individuals to find new solutions to new situations without calculated deliberation, based on their gut feelings and intuitions, which he believed were collective and socially shaped. These attitudes, mannerisms, tastes, moral intuitions and habits have influence on the individual's life chances, so the habitus not only is structured by an individual's objective past position in the social structure but also structures the individual's future life path." (https://en.wikipedia.org/wiki/Habitus_(sociology)

Bourdieu wrote that "*The habitus, a product of history, produces individual and collective practices - more history - in accordance with the schemes generated by history. It ensures the active presence of past experiences, which, deposited in each organism in the form of schemes of perception, thought and action, tend to guarantee the 'correctness' of practices and their constancy over time, more reliably than all formal rules and explicit norms. This system dispositions - a pleasant past that tends to perpetuate itself into the future by reactivation in similarly structured practices, an internal law through which the law of external necessities, irreducible to immediate constraints, is constantly exerted - is the principle of the continuity and regularity which objectivism sees in social practices without being able to account for it; and also of the regulated transformations that cannot be explained either by the extrinsic, instantaneous determinisms of mechanistic sociologism or by the purely internal but equally instantaneous determination of spontaneist subjectivism.*

In so far - and only in so far - as habitus are the incorporation of the same history, or more concretely, of the same history objectified in habitus and structures, the practices they generate are mutually intelligible and immediately adjusted to the structures, and also objectively concerted and endowed with an objective meaning that is at once unitary and systematic, transcending subjective intentions and conscious projects, whether individual or collective. One of the fundamental effects of the harmony between practical sense and objectified meaning (sense) is the production of a common-sense world, whose immediate self-evidence

is accompanied by the objectivity provided by consensus on the meaning of practices and the world, in other words the harmonization of the agents' experiences and the constant reinforcement each of them receives from expression individual or collective (in festivals, for example), improvised or programmed (commonplaces, sayings) - of similar or identical experiences.

The homogeneity of habitus that is observed within the limits of a class of conditions of existence and social conditionings is what causes practices and works to be immediately intelligible and foreseeable, and hence taken for granted. The habitus makes questions of intention superfluous, not only in the production but also in the deciphering of practices and works." (Bourdieu, 1990: 58)

[…]

"The practices of the members of the same group or, in a differentiated society, the same class, are always more and better harmonized than the agents know or wish, because, as Leibniz again says, 'following only (his) own laws', each 'nonetheless agrees with the other'. The habitus is precisely this immanent law, lex insita, inscribed in bodies by identical histories, which is the precondition not only for the co-ordination of practices but also for practices of co-ordination." (Bourdieu, 1990:59)

Practice theory approaches thus treat societal phenomena in a new way by focusing on the 'space' between individuals' activities and wider social structures, which is often ignored in more individualist or structuralist approaches. In a nutshell Practice theory: places the social in 'practices', and, that it treats practices as the 'smallest unit' of social analysis.

The question now is: What practices are? Following Shove et al. (2012) first of all, it is necessary to distinguish between 'practice' and 'practices' - in German there is the useful difference between -

(Praxis and Praktiken). 'Practice' (Praxis) in the singular represents merely an emphatic term to describe the whole of human action (in contrast to 'theory' and mere thinking). 'Practices' in the sense of the theory of social practices, however, is something else. A 'practice' (Praktik) is a routinized type of behaviour which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge.

A practice – a way of cooking, of consuming, of working, of investigating, of taking care of oneself or of others, etc. – forms so to speak a 'block' whose existence necessarily depends on the existence and specific interconnectedness of these elements, and which cannot be reduced to any one of these single elements.

Likewise, a practice represents a pattern which can be filled out by a multitude of single and often unique actions reproducing the practice (a certain way of consuming goods can be filled out by plenty of actual acts of consumption). A practice is thus a routinized way in which bodies are moved, objects are handled, subjects are treated, things are described, and the world is understood.

In a nutshell:

- Practices are routine behaviour that integrates different kinds of elements, such as bodily and mental activities, material artefacts, knowledge, meaning, skills, and so on (Reckwitz, 2002).
- Practices are social as they are similar for different people at different points of time and locations. (Reckwitz, 2002).
- Social practices hence refer to regularities – patterns how certain mundane practices are typically and habitually performed in (a considerable part of) a society. Holtz, Georg (2013)
- Practice constitute patterns of interconnected elements that are recognizable across time and space while the practice is reproduced by individuals and new individuals are recruited to the practice (cf. Røpke, 2009).

- Individuals are seen as the "carriers of practices" and they do not freely choose between practices based on utility or similar individualistic concepts but are "recruited" to practices according to their background and history (Reckwitz 2002).
- The individual's involvement in some practice for a certain amount of time leaves traces in the individual, such as acquired knowledge and skills and the accumulation of material artefacts.
- These "sediments" make it easier and more likely to become involved in some practices but not in others, i.e. the involvement in practices is path-dependent (Røpke, 2009).

From an analytical perspective, it makes sense to view a practice as an organized entity on the one hand, and as the performance of such an entity on the other (Schatzki, 2002).

As stated by Jonas and Littig (2015), while the former concentrates on the different aspects that constitute the organization of a practice, the latter looks at the activities carried out by the actors involved. Organizational aspects include understandings, rules, and teleoaffective structures or leitmotifs that constitute a practice.

- Understandings refer to those physical and mental skills that individuals require to engage in a practice.
- Rules include instructions for actions that are used either consciously or subconsciously by the actors involved. They can be implicit or explicit and range from virtually uncodifiable (e.g., rules of thumb, hints) to strongly codified (e.g., regulations, laws).
- A teleoaffective structure incorporates all target-oriented and affective orientations that determine which activities are suitable and appropriate enactments for a practice and which are not.
- The sociomaterial context in which a practice is carried out is sometimes viewed as a further organizational aspect (Shove et al., 2012). In contrast, the understanding of a practice as the performance of an activity assumes that the practices of the actors must be enacted through appropriate doings and sayings to have an effect in their societal context. At the same time, there is a strong focus on the material embeddedness of these activities, for example, how a sequence of motions is carried out within a particular sociomaterial space, what artefacts and behavioural scripts are needed to do so as well as the level of involvement of other beings (Schatzki, 2010). The sociomaterial context of practices (Jonas and Littig, 2015) is often (not always) understood as networks of human and nonhuman beings, organisms, and artefacts, which together with the performance of corresponding practices constitute the social site in which an individual is located. Here, individuals are viewed as carriers of social practices. Consequentially, individual subjectivity or the adoption of a particular lifestyle is not attributed to individual performance. Instead, the focus is on how practices and their sociomaterial contexts facilitate, encourage, shape, or prevent the formation of subjectivity or the adoption of a particular lifestyle.

However, practice theory is not only a specific strand of social theory. Interestingly, a practice theory perspective also requires a specific methodological approach which takes a 'practical turn' toward research objects, i.e., the phenomena studied using scientific practices. Praxeological analyses situate their research objects in fields of embodied, materially mediated activities and processes which are organized along collectively shared forms of practical knowledge and competences. The praxeological perspective (Jonas, Littig, 2015) is a particular lens on social phenomena which emphasizes the collective organization and mutual interdependence of social life. However, this approach carried out additional problems because doesn't exist a clear agreement of the methodological aspect of social practice (Jonas, Littig, 2017). In facts, there is considerable disagreement among advocates of practice theory regarding the methods that are suitable for studying social practices. Participant observation was long held to be the primary research method. Meanwhile, other methods such

as discourse analysis, qualitative interviews, and extended ethnographic research increasingly form part of the methodological repertoire. Despite the dominance of qualitative modes of inquiry, some argue that a practice theory perspective does by no means preclude quantitative research.

Now the qualitative approach is not very suitable in a perspective of computational social sciences and a use of machine learning to harness diversity. On the other hand, the problem is what kind of rule should we follow when collecting data? How can we capture the complexity of single practices and systems of practices without loss of information? To meet such demands, a solution here proposes is praxeology method. From a praxeological perspective, it makes sense to differentiate between habits and practices. All habits can be designated as practices, but practices are often more than just a set of habits. Many of the empirical studies demonstrate the flexibility of practices for a context in which habits are grasped not as primarily rigid patterns of behaviour but as partially flexible and creative processes that facilitate adaptation to different situations. Habits and routines are thus not opposites to reflexive action but form the necessary conditions for it.

The second is to define the objects that compose a practice. Schatzki (2002) views practices as open and spatially, temporally dispersed sets of doings and sayings organised by common understandings, teleology (ends and tasks) and rules. Practices are inevitably entangled with the material arrangements that they contribute to create, in which they are carried out and through which they transpire (Nicolini, 2017). Examples of material arrangements are artefacts, linked people, organisms and elements of nature. The basic unit of analysis of all things human are thus bundles of practices and material arrangements.

Following the above (Shove et al. 2012) practice is a configuration of three components: material, meaning and competence. The elements are linked within but also across these components to form a 'block' of interconnected elements – the practice (*Figure 8*). (Shove and Pantzar 2005, Røpke 2009).

Figure 8 The elements of practice
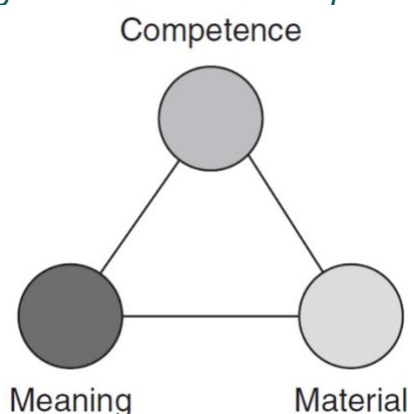
The Material covers all physical aspects of the performance of a practice, including the human body. Materials, encompassing objects, infrastructures, tools, hardware and the body itself (Shove et al., 2012). It is a sequence of bodily activities involving the usage of material artefacts, such as technological artefacts or everyday commodities. For example, (Shove et al., 2012) one may go to work by car individually, by car-pooling, by bike or by bus. Material then covers all kind of activities such as going to the bus stop, buying a ticket, taking a seat, signalling the bus driver to stop, etc.

The competence incorporates skills and knowledge which are required to perform the practice. The know-how, background knowledge, understanding as well as social and relational skill are taken to be crucial whether in the form of what Giddens (1984) describes as practical consciousness, deliberately cultivated skill, or more abstractly, as shared understandings of good or appropriate performance in terms of which specific enactments are judged. Knowing

in the sense of being able to evaluate a performance is not the same as knowing in the sense of having the skills required to perform, and in some situations, this is an important distinction (Warde, 2005).

Competences are embodied in the individual and can neither (easily) be directly observed nor (easily) exchanged between individuals. Still they are social in the sense that they are shared by many individuals and may be reflected also in the wider social structure, e.g. in driving schools. Examples (Shove et al., 2012) are driving skills, cycling skills, and knowledge about public transport routes. The bus user knows where the bus stop is, which ticket is cheapest, which bus number to take, and where to get off the bus.

The meaning incorporates the issues which are considered to be relevant with respect to that material, i.e. the understandings, beliefs and emotions. As mental activities, emotion and motivational knowledge into the one broad element of 'meaning', a term we use to represent the social and symbolic significance of participation at any one moment. The issues considered and the respective understandings, beliefs and emotions are socially shared and may be discussed and negotiated in communication of individuals. Example (Shove et al., 2012) are issues of relevance associated with the travel mode of going to work are for example: environmental effect, social status and flexibility. Someone going by bus regularly may associate it with being cheap, having time for reading, or enjoying the company of others.

In the meaning (Shove et al., 2012) the question is not *'Who determines whether smoking cigarettes and driving fast cars is transgressive or cool?'* but rather *'How are categories like those of being cool, healthy or youthful populated with practices, how does this population change and with what consequence for these frames of meaning?'*.

In brief: Materiality, Competence, Meaning
- First, materials are the only elements that literally move in the sense of being physically transported. While competences and images appear to circulate, critical processes have to do with localized forms of de- and re-linking, a feature about which we have more to say below.
- Second, materials have characteristics (weight, fragility etc.) that affect, but which are only sometimes transformed by, processes of transportation. By contrast, meanings and competences are routinely modified as their reach and range extend or contracts.
- Third, with materials as with competences and meanings, the rate and extent of actual and potential circulation depends on the existence or otherwise of appropriate infrastructures, for instance, of transportation or mediation.
- Fourth, processes of codification and de-codification matter for the circulation of competence and meaning, but not for material.
- Fifth, some kinds of know-how can only be acquired and can only 'travel' if there is a base or foundation of existing competence on which to build. This limits the population of potential carriers and the extent to which specific competences can move.
- Sixth, acquiring new forms of skill often takes time. By contrast, meanings (i.e. forms of association) can change and emerge and can travel far and fast. That said, the effective appropriation of meanings and competences depends on local capacities to embed, 'reverse' and interpret. Such capacities are unevenly distributed and are, in turn, born of practices past.

Table 4 Social practices at glance.

	Characteristics	Diversity in a sociological perspective

Materiality	• Physical Transferability
	• Transportation and access
	• The close-coupled relation between materiality and competence and the possibility that access to these equally essential elements is <u>unequally and unevenly distributed</u>.
		Social Inequality (e.g. Social Class)
		  • Ascriptive (Soc. origins, sex, …)
		  • Acquisitive (Education, Job …)
		Resources (Economics, Environmental)
		Social Inclusion/exclusion

Competence	• Knowing how to decode
	• Abstraction, reversal, interpret, lateral migration and cross-practice creep
	• knowing how (to decode) is <u>unevenly distributed</u> because it is itself an outcome of prior experience.
		Human Capital
		  • Education, skills, …
		Social Capital
		  • Social Network (homophily, social distance, …)

Meanings	• Association & classification
	In making a practice, subjects:
	  • locate themselves within society.
	  • reproduce specific schemes and structures of meaning and order
	  • The capacities of appropriation of meanings and competences are <u>unevenly distributed</u> and depends on local capacities born of practices past.
		Values,
		Norms,
		Social representations,
		Life style, Habitus, … Cultural practices are 'automatically classified and classifying, rank ordered and rank ordering'

1.6 PRELIMINARY CONSIDERATIONS ABOUT SOCIAL PRACTICES IN THE CONTEXT OF WENET

The previous sections indicated that there is no unambiguous, clear and theoretically defined definition of diversity. However, at least two levels of diversity clearly emerge. The first concerns the specificity of each individual and pertains to its dimensions: Psycho-social profile, Social Network, Daily Life, Life Style, Community of Practices: Academic, Consumption & Life Style.

The second at the level of the population which in turn is divided into two parts. The first is the diversity based on the socio-bio-geo- characteristics, etc., from the norms, from the values, in a nutshell from the habitus in which they are immersed made tangible in its manifestations in social practices. The second that arises from the comparison of the individual with the reference population. The diversity in this case we can define as the degree of deviation between the subject and the population based on the same practice.

*FIGURE 9 DIVERSITY-AWARE LEARNING OF INDIVIDUAL BEHAVIOUR*
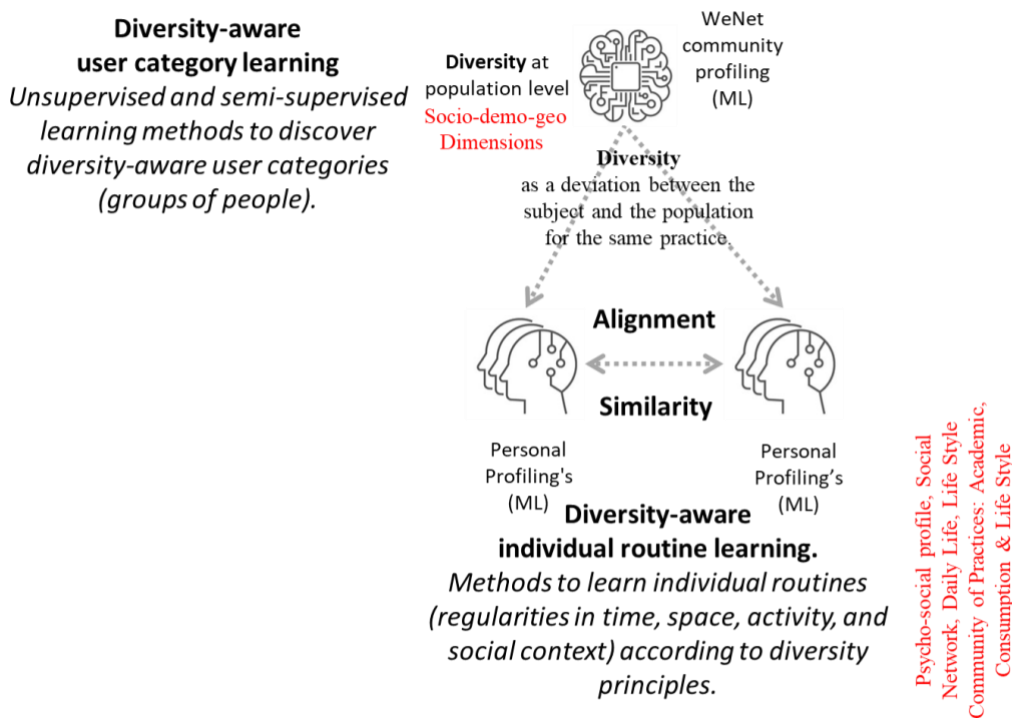
On the other hand, taking advantage of diversity to improve the conditions of individuals through the activation of relationships requires that at least two conditions. The first is that there is a *need* to satisfy. The second is that there is someone who has the skills to satisfy it. In a world that is not mediated by a machine, my action is aimed at satisfying my needs as effectively as possible. If I look for a companion to prepare an exam, I will not start my research based on sex, age, ethnicity, etc., but on the basis of other characteristics that concern the set of factors that define the match between the need expressed by me and the skills and abilities of those who could best satisfy my need.

It is not easy to determine what makes the subject *X* be exactly the person who will solve my need. We can however say that, always in a world not mediated by the machine, we operate in two directions, the first is to ask those around us. The second one, based on our previous experience and with a definition of the need is addressed to those who, based on their characteristics, are most likely to fulfill the request. This can only be done through the evaluation of the set of skills that are deemed necessary. However, simple skills are not a sufficiently reliable index. Knowing how an engine works does not automatically mean that the person can repair it. Therefore, what is needed is that the subject has a series of features that make him a practitioner in a simple way.

The diversity that we can exploit in this way is based on the practices performed by the subject, which due to their characteristics are those that respond to the solution of our needs.

FIGURE 10 VARIABLE-CENTRIC PERSPECTIVE
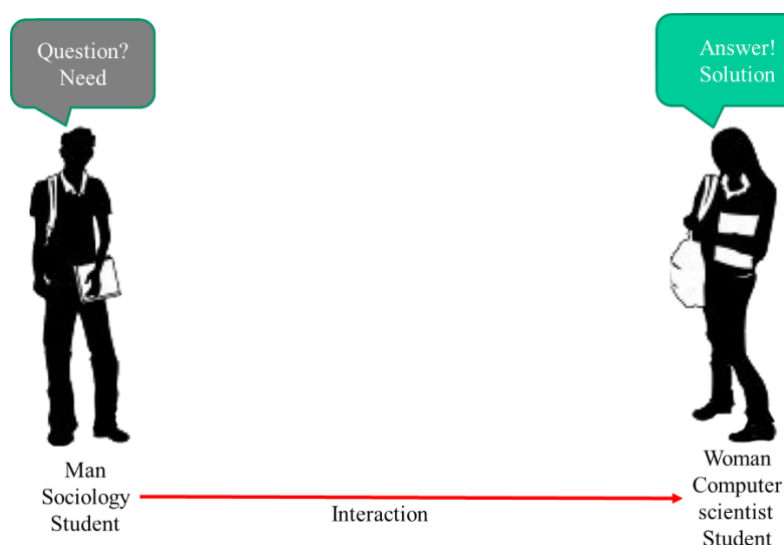
For example, (Figure 10) instead of defining a clear and useless diversity based on gender, course of study, etc. this is defined as the profile of the practices exhibited by the subject (Figure 11). Hence, we will have, for example, that he loves going to parties, and driving a car, while she loves doing sports, reading books in English, holding a healthy cooking blog and going to parties. Clearly, shifting our attention from a variable centric perspective to a centric person, these same (practical) properties outline, if taken together, a diversity that is based on what they do and love to do rather than on their socio-demographic characteristics.

FIGURE 11 SOCIAL PRACTICE APPROACH: AN HOLISTIC PERSPECTIVE
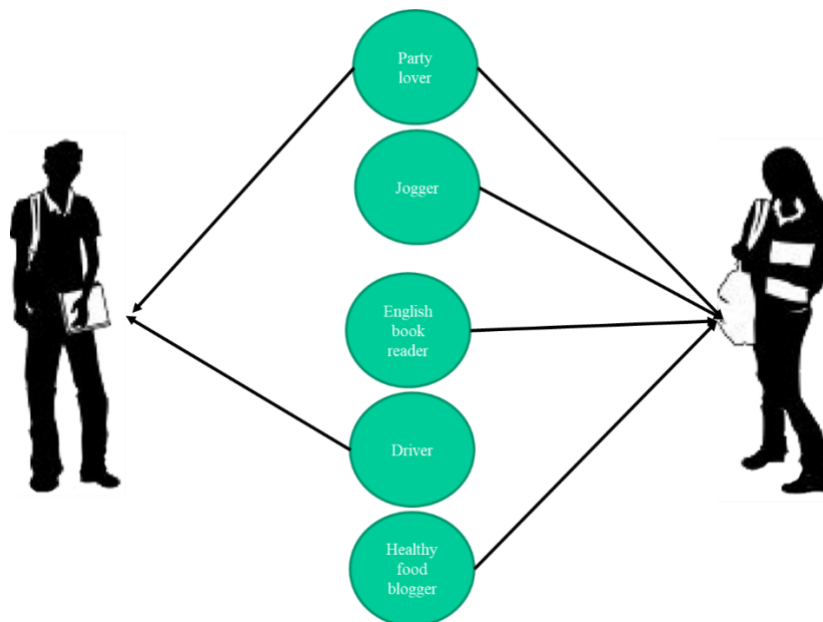
In this way it is easy to understand how the match between two people can take place in a more intuitive and simple way. As for example, faced with his need to prepare for the English exam (Figure 12), the relationship with those who could help him is given based on the fact that she regularly reads books in English. This does not give you the certainty that you can provide the help you want. However, in a situation of uncertainty, certainly you as a practitioner are more likely to have the characteristics useful to satisfy your request.

FIGURE 12
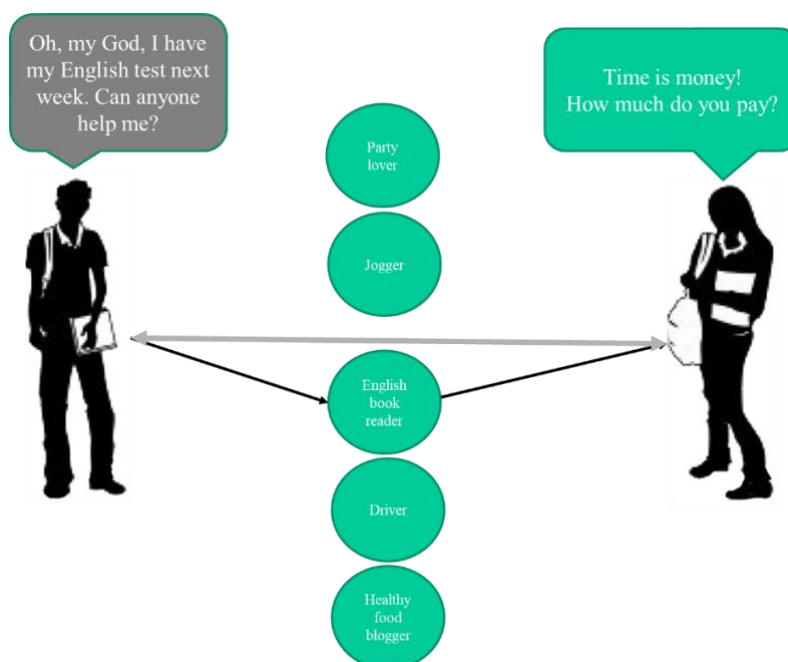
The use of social practices in this context not only makes it possible to bring diversity to another level, but also allows us to define a rigorous method of collecting information.

FIGURE 13 THE SEMANTIC MODEL
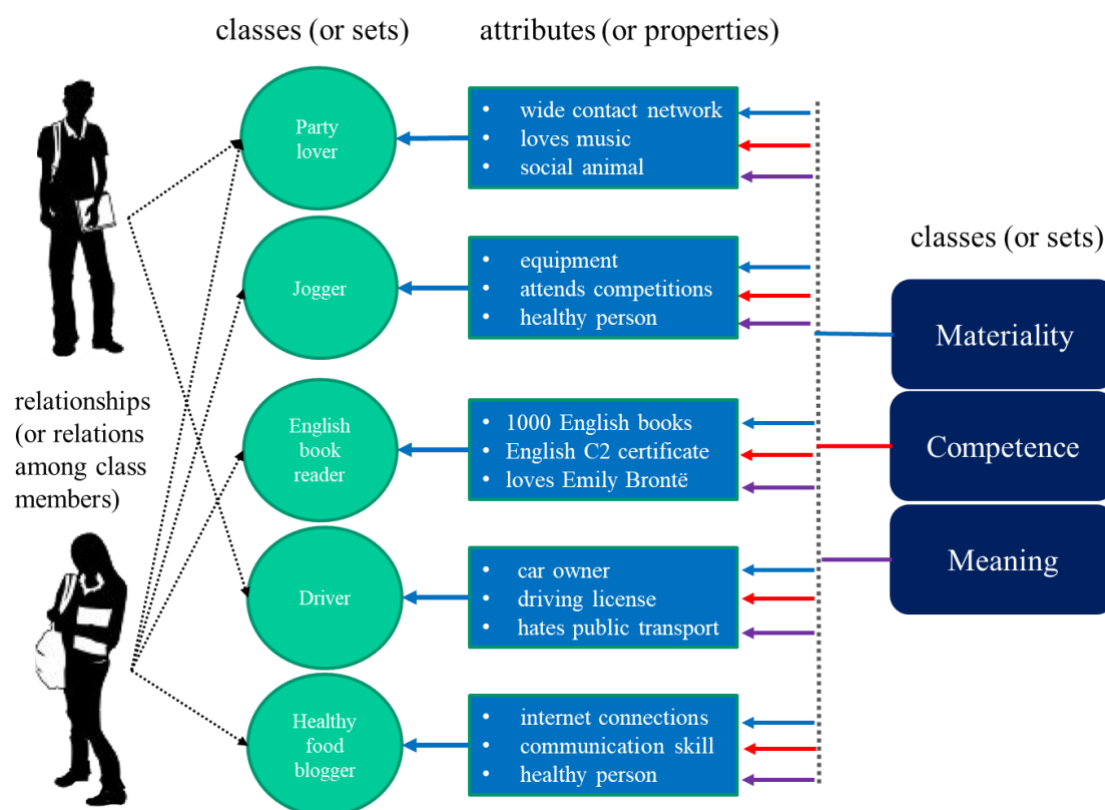
In other words, we define a protocol that provides that the information gathered is not limited to the competences only but has in addition both the material and the meaning component. In fact, only the combination of these three components allows us to clearly delineate the real degree of adherence to a given practice.

This structure, in turn, can be translated into a semantic model, which sees social practices as classes, as attributes or properties, the features that make up each individual practice, which in turn are defined within a second class of objects that is defined in terms of materiality, competence, and meaning. Last, the relationships between subjects will be given by the relationships that bind each of them with their social practices.

2 CONCLUSIONS

To summarise, a possibility of making the project's objective operational is to measure social practices within a given population. This will require, through the collection of each student's specific information, the possibility of defining, even if limited, the social, regulatory, values and cultural context of the population: in a nutshell, the habitus.

This approach will help, always in a context of social practices, to relate the individual social practices within the environment that generated them. It will eventually allow the central aspect of this project to emerge: diversity. Understanding both as a different chance to carry out and develop a given practice in given contexts that nevertheless can share the same habitus, or as the presence of practices that are also significantly different due to you have different habitus in which our subjects are immersed.

FIGURE 14 SOCIAL SPHERE
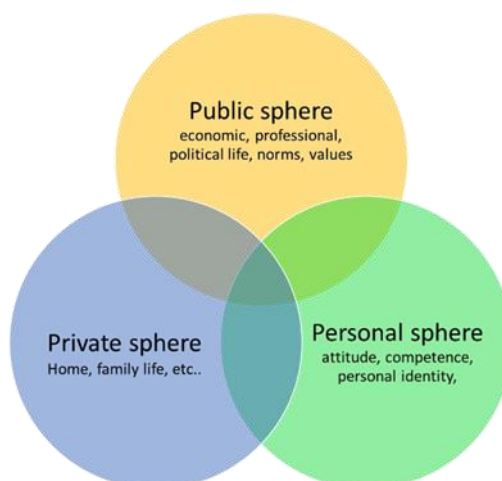
The structure of the investigated areas will follow the classic division that sees the integration of the two main spheres of action in which individuals find themselves (private and public) mediated by the personal cognitive dimension composed of norms, values and personality traits (Figure 14).

FIGURE 15 SUBDIMENSION OF STUDENT TRAITS HABITUS
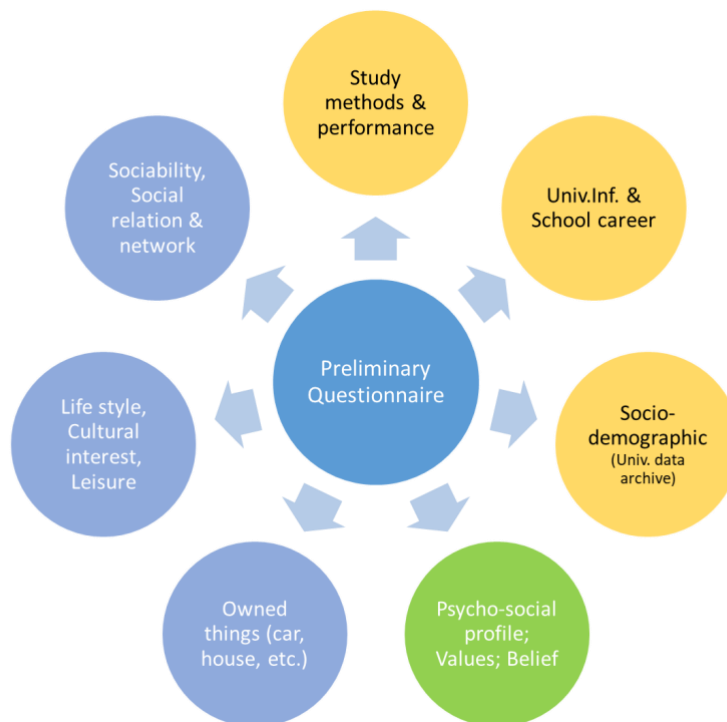
In turn these dimensions will be further declined according to the sub-dimensions ascribable to them specific to the student population (Figure 15). Examples of this subdimensions are:

Socio-demographic dimensions

- (e.g. sex, age, birth place, residence, marital status, etc.)
- Social Origins
- Enrolments (Dep. Courses, etc.)

Sociability, Social relation and social Network Dimensions

- Social distance
- Social Skill/competence
- Network characteristics

Psycho-social profile; values; Belief

- Procrastination syndrome
- Life-style
- Sociability scale/cooperative
- Values scale

Daily Life Planning

- Time

- Space

- Activities

Practices: Consumption & Life Style; leisure; consumption, etc.

- Feeding styles/Nutrition

- Free Time / Cultural activities

- Sports

- Social Life

- etc.

Owned things

- Car

- House

- Etc.

Practices: Academic: Study methods & performance

- Performance

- Studying profile

- Skill

- etc.

Practices: Academic: University and school career

- School Career

- University career

- etc.

In conclusion, the definition and development of methods that allow the definition of social practices will in turn allow them to move on to the next phase, namely the exploitation of diversity as a factor to establish useful relationships to satisfy the needs of individuals through the expressed social practices. This proposal will have to be discussed with the other project partners and related to the parallel work that has been in done in relevant WPs like WP7. In any case, for the moment, we have developed a preliminary survey aimed at capturing the above described dimensions and that we have included in the Appendix A.

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APPENDIX A

Anything that is related but not core to the deliverable can go into appendix.

UNIVERSITY & LECTURE ATTENDANCE

Do you attend at least one course during this semester?
- *Yes*
- *No*

How many courses are you attending? |__|

What courses are you attending? (LIST of courses)

How often did you come to university for lessons, exams or other purposes?
- *Rarely / Never (Filter go to X)*
- *Monthly or less (Filter go to X)*
- *Once a week*
- *Twice a week*
- *Three days a week*
- *Four days a week*
- *Five or more days a week*

On what days are you at the university (not just for lessons):
- *Monday*
- *Tuesday*
- *Wednesday*
- *Thursday*
- *Friday*
- *Saturday*
- *Sunday*
- *There were no specific days*

On average, over this period:
How many hours of lessons do you attend per week? Hours |__| (99) I did not attend lessons
How many hours a day do you spend at university (including going to the library, canteen, labs, etc.)? Hours |__|
How many hours a day do you spend on individual study on weekdays? (Monday-Friday) Hours |__|
How many hours a day do you spend on individual study at weekends? (Saturday and Sunday) Hours |__|

How often it happened to: (1 "never" – 5 "very often")
- *participating during the lesson to express your opinion*
- *asking for clarifications to teachers during or at the end of the lesson*
- *going to the teacher's office*
- *joining seminars or other academic activities*
- *take notes in class.*
- *review and arrange notes at the end of the lesson.*
- *audio recording of the lecture.*
- *study and review notes regularly during the class week*
- *schematizing or summarizing books or notes related to a course*
- *be on time for class.*
- *take part in the activities organized by the course.*

UNIVERSITY SPACES

Last month how often did you study in the following places: *Answers from 1 "never" to 4 "always"*
- *House (your room)*
- *House (common spaces)*
- *Library*
- *Study room in your department*
- *Study room in another department*
- *Other (specify…)*

When you are at university where you spend most of your free time / breaks? *Please indicate the two most frequented places.*
- *break area (vending machines)*
- *bar/pub*
- *courtyard or nearby spaces*
- *hallway, corridor*
- *empty classrooms*
- *study room*
- *other (specify)*

SOCIAL RELATIONS WITH PEERS/CLASSMATES.

How many university students do you know? |__|
How many university students can you contact for help in studying? |__|
In the last six months, how many new classmates have you known? |__|
How many classmates have become your friends? |__|

How often do you happen to: (1 never – 5 always).
- *Stop and talk to your classmates before or after class*
- *Going to lunch together/taking breaks with your classmates*
- *Going out/doing extracurricular activities with classmates*
- *Exchange course notes/materials*
- *Participate in study groups (excluding group work)*

Think of the group you meet the most during the week.
How many people are in this group? |__|__|

This group is composed mainly of:
- *men*
- *women*
- *about the same number of men and women.*

This group is composed of:
- *Only university student*
- *Only other people who are not university students*
- *Mainly university students*
- *Mainly other people who are not university students*
- *About the same number of university students and others people.*

In the group you meet the most during the week, how often do you talk about these topics? Answers from 1 "rarely" to 4 "very often"
- *Current events/News*
- *Sports*
- *Music and music events*
- *Cinema/movies*
- *Books/Literature*
- *Politics*
- *Daily life and personal relationships*
- *Love affairs*
- *University*
- *Culture/Art*

In the group you meet the most during the week, how much do you agree with the following statements?
Answers from 1 "Totally agree" to 4 "Totally disagree"
- *I often suggest where to go*
- *If two are in disagreement, I try to make them reconcile.*
- *If someone doesn't agree with me, I always try to change their opinion.*
- *The group consider my opinion very seriously.*
- *People in this group often ask me for help.*
- *When I have a problem, I mainly ask the people in this group.*

ACCOMMODATION
Space (Type and location of accommodation)

Where do you live during term time?
And exactly in which area of the town do you live?

In which kind of accommodation do you live?
- *University students' dormitory*
- *University flat*
- *Private students' dormitory*
- *Rental house/flat*
- *in a house/apartment owned (by you, your parents or relatives)*
- *guest by a private person*
- *guest from a friend or friends*

With whom do you live??
- *Alone*
- *Other students*
- *Partner*
- *Your children*
- *Parents or other relatives*
- *Other (specify)*

Do you have a: (only for people who don't live alone).
- *Single bedroom*
- *Bedroom shared with another person*
- *Bedroom shared with two people or more*

In addition to you, how many people do you share the apartment with? |__|

How many of these people attend university? |__|

In your home/flat, which items do you have?
- *Colour television (common area)*
- *Colour television (in your bedroom)*
- *Home theatre/Stereo system*
- *Video recorder/DVD player*
- *Satellite dish / Sky TV*
- *Home computer/PC*
- *Laptop computer*
- *Tablet*
- *Landline telephone*
- *Internet cable/broadband connection*
- *Wi-Fi*
- *Mobile telephone*

How do you rate the internet connection in your home? answers from 1 "very bad" to 5 "very good" + "I have no internet access in my accommodation"

TRANSPORT PART 1: FROM – TO DEPARTMENT

What time do you usually leave home to go to your department? *[Hours:Minutes]*
What time do you usually arrive to your department? *[Hours:Minutes]*
What time do you usually leave your department to go back home? *[Hours:Minutes]*
What time do you usually get back home from your department? *[Hours:Minutes]*

From the doorstep of your home/accommodation, what is the first mode of transport you use to get to university?
1. *None, I live less than 300 meters from my department (Filter: go to E11)*
2. *Walking (if more than 300m)*
3. *bike*
4. *motorbike*
5. *car as driver*
6. *car as passenger*
7. *car pooling*
8. *city bus*
9. *suburban bus*
10. *train*
11. *Other _____*

After this, do arrive to your department or do you change transportation?
1. *I arrive to my department. (Filter: go to E11)*
2. *I still walk. (If more than 300meters)*
3. *I still ride the bike.*
4. *I still use the motorbike.*
5. *I still use a car as driver.*
6. *I still use a car as passenger.*
7. *I still use car pooling.*
8. *I still take a bus.*
9. *I still take a train.*
10. *I still take another form of transport. Specify _____*

After this, do arrive to your department or do you change transportation?
After this, do arrive to your department or do you change transportation?
After this, do arrive to your department or do you change transportation?

All in all, what is your commute time and distance from your accommodation/home to university?
1. *Time in minutes _____*
2. *Distance in Km _____   (Note: use decimals to indicate meters. For example, enter 0.800 if you travel 800 meter or write in 2.5 if you travel two and a half kilometres.)*

TRANSPORT PART 2: DAILY MODES OF TRANSPORTATION

Let us talk about the daily modes of transportation you use to move around, not just to go to university.

E12. Do you have …?

	Yes	No
1. …a car driver's license?		
2. …a motorbike driver's license?		
3. …a bike of your own?		
4. …a car of your own?		
5. …a motorbike of your own?		
6. …access to a car whenever you want?		
7. …access to a motorbike whenever you want?		

E13. Could you tell us the main method that you use for getting about in your daily life?
1. *Walking*
2. *Cycling*
3. *Car (Filter: go to question E15)*
4. *Car-sharing (with friends/relative etc.) (Filter: go to question E15)*
5. *Motorbike (Filter: go to question E15)*
6. *City bus/suburban bus (Filter: go to question E16)*
7. *Train (Filter: go to question E16)*

E14. Why do you opt for <u>walking/cycling</u> to get about in your daily life? Select all that apply.
1. *Travel speed / time*
2. *Travel comfort*
3. *Flexibility --can make stops or detours*
4. *Safety*
5. *Reliability*
6. *Autonomy*
7. *Fitness*
8. *Relax / recreation*
9. *Low costs involved*
10. *Good pavement conditions*
11. *Available cycling paths*
12. *Environmental concerns*
13. *Available bicycle racks*
14. *Physical mobility or health problems*
15. *No or limited access to a car/motorbike*
16. *Living within a walking/bike distance from all places of my interest.*
17. *No public transport alternatives*
18. *Scarce car/motorbike parking space*
19. *No alternatives available*
20. *Friends of mine walk/cycle too*
21. *Other, specify: _____ (filter)*

E14b How often do you use public transport?
(1) Never (2) Seldom (3) Sometimes (4) Often (Filter go to E17), (5) Always (Filter go to E17)

E14c Why don't you use public transport more often? *Select all that apply (Filter, go to E17)*
1. *It is far from where I live.*
2. *It is far from where I study / work.*
3. *It is slow.*
4. *It is crowded.*
5. *It is dirty.*
6. *It is unreliable. (not punctual or infrequent)*
7. *It doesn't take me where I need.*
8. *It doesn't run when I need it. (morning / night)*

E15. Why do you opt for <u>car/car-sharing/motorbike</u> to get about in your daily life? Select all that apply.
1. *Travel speed / time*
2. *Travel comfort*
3. *Flexibility --can make stops or detours*

4. *Safety*
5. *Reliability*
6. *Autonomy*
7. *Relax / recreation*
8. *Low costs involved*
9. *Environmental concerns*
10. *Like driving / riding a motorbike*
11. *Available car/motorbike parking space*
12. *Physical mobility or health problems*
13. *Car-pooling opportunity*
14. *No alternatives available*
15. *Flexibility to do other tasks (shopping, sports, etc)*
16. *Car/motorbike necessary for my job*
17. *Friends of mine use car/motorbike too*
18. *Other, specify: _____*

E15b How often do you use public transport?
(1) Never (2) Seldom (3) Sometimes (4) Often (Filter go to E17) (5) Always (Filter go to E17)

E15c Why don't you use public transport often? *Select all that apply (Filter go to E17)*
1. It is far from where I live.
2. It is far from where I study / work.
3. It is slow.
4. It is crowded.
5. It is dirty.
6. It is unreliable. (non-punctual or infrequent)
7. It doesn't take me where I need.
8. It doesn't run when I need it. (morning / night)

E16. Why do you opt to use <u>public transportation</u> in your daily life? Select all that apply.
1. *Travel speed / time*
2. *Travel comfort*
3. *Flexibility - can make stops or detours*
4. *Safety*
5. *Reliability*
6. *Less stressful than other means of transport*
7. *Low costs involved*
8. *Environmental concerns*
9. *Public transportation easily takes me to places of my interest*
10. *Availability of mobility card (free circulation pass)*
11. *Convenient public transport schedules and/or routes*
12. *Public transportation close to where I live*
13. *Public transportation close to my work/study place*
14. *Enjoy time to read, chat, relax or work/study*
15. *To avoid parking problems*
16. *To avoid traffic problems*
17. *Physical mobility or health problems*
18. *No alternatives available*
19. *Autonomy*
20. *Fitness*
21. *Relax / recreation*
22. *Friends of mine use public transport too*
23. *Other, specify: _____*

TRANSPORT PART 3: TRAVELING COMPETENCES

How often do you use the following apps? *(1) Never (2) Seldom (3) Sometimes (4) Often (5) Always (99) Haven't installed it.*

1. *Local Public transport apps (Open Move, etc.)*
2. *National/international transport company apps (Trenitalia, Italo, Obb)*
3. *Low-cost company app (e.g. FlixBus)*
4. *Travel utility apps (Orario treni)*
5. *Navigation app (Waze, google maps, etc..)*
6. *Share journey app (BlaBlaCar, etc..)*
7. *Weather app*
8. *Pay parking (ex. Mycicero)*
9. *Other travel app, specify (filter)*

Over the past two years, how often have you used the following means of transportation? *(1) Rarely/Never (2) Few times a year (3) Monthly (4) Few times a month (5) Weekly (6) Daily*

1. *Bike*
2. *Bike sharing*
3. *Motorbike*
4. *Car as a driver*
5. *Car as a passenger*
6. *Car sharing*
7. *Car-pooling*
8. *BlaBlaCar*
9. *City bus*
10. *Suburban bus*
11. *Low-cost bus (e.g. FlixBus)*
12. *Train*
13. *Underground*
14. *Airplane*

Excluding the town(s) where you stay and/or study, over the past two years, how often have you…? *(1) Never (2) Seldom (3) Sometimes (4) Often (5) Always*

1. *…visit the historical centres of cities in Italy?*
2. *…visit big cities in Italy? (e.g. Rome, Milan, Venice)*
3. *…visit big cities in Europe? (e.g. Paris, Madrid, London)*
4. *…travel across European countries?*
5. *…travel across non-European countries?*

Finally, please tell us how often you do the following things. *(1) Never (2) Seldom (3) Sometimes (4) Often (5) Always*

1. *Turn off your electrical appliances when leaving your house*
2. *Unplug your mobile phone after fully charging it*
3. *Shut down your computer after you finish working with it*
4. *Travel by public transport in your daily life*
5. *Ride the bicycle or use public transportation to get to nearby destinations*
6. *Buy fruits and vegetables from the open bins at the supermarket*
7. *Use paper bags rather than plastic ones when shopping for groceries*
8. *Buy products with eco-label*
9. *Take showers rather than baths*
10. *Open the windows for longer than 15 minutes to let fresh air in during winter*
11. *Turn off your heat when you leave the house/accommodation*
12. *Turn off the tap when brushing your teeth*
13. *Dispose of your dead batteries in your regular trash*
14. *Use litter bins*
15. *Sort your paper, glass and plastic recyclables at home/accommodation and place them in different bins for their collection*

BODY CARE
BODY CARE PART 1. PHYSICAL ACTIVITIES.

B25. What would you say is your current level of physical activity? Would you say…?
1. *You are physically active at present.*
2. *Not now, but you've been physically active on a regular basis for the past six months or longer.*
3. *You don't right now, but plan to start in the next six months. * Filter: go to B38*
4. *You don't currently engage in regular physical activity. * Filter: go to B38*
5. *You can't exercise. Filter go to part2*

B26. What is your level of participation in sports?
1. *Professional*
2. *Amateur*
3. *Recreational*

B27. How often do you engage in competitions?
1. *Never*
2. *Rarely*
3. *Sometimes*
4. *Often*
5. *Always*

B28. During the past 12 months, how often have you done the following types of sport activities? *1. Not at all / 2. Less than once a week / 3. At least once a week / 4. Almost daily*
1. *Cardio/fitness activities like swimming, running, jogging, stair climbing, cycling or rope skipping*
2. *Yoga, stretching and fitness dancing activities like aerobics, dance exercise, pilates*
3. *Water sports like skiing, snowboarding, wakeboarding, diving, canoeing or rowing*
4. *Weightlifting and resistance training including free weights, bench press, leg press, push ups, pull ups or sit ups*
5. *Team sports like soccer, basketball, hockey, baseball, and volleyball*
6. *Boxing and martial arts like judo, karate and taekwondo*
7. *Racket sports such as tennis, ping pong, and squash*
8. *Outdoor recreational sports like climbing, hill trekking, walking, mountain biking, orienteering, skateboarding*

B29. How often do you exercise?
1. *Less than monthly*
2. *Monthly*
3. *Every few weeks*
4. *Once or twice a week*
5. *Three to five days a week*
6. *Six to seven days a week*

B30. With whom do you exercise? *(CHECK ONLY ONE)*
1. *I usually exercise by myself.*
2. *I usually exercise with others – friends, family members, trainers, a group or class.*
3. *I exercise by myself as much as I exercise with other people.*

B31. How often do you use these facilities to exercise or play sports?
1. Rarely or Never 2. Sometimes 3. Often 4. Very Often
1. *University facilities*
2. *Private gyms, pools, courts, climbing walls*
3. *Outdoor public spaces*
4. *Home*
5. *Other: _____(Filter b31a)*

B32. Are you affiliated to UniSport and/or any other sport association(s)?
1. *only to UniSport*
2. *only to associations*
3. *both to UniSport and other association(s)*

    4. *neither to UniSport nor to other associations*

B33(for B32 all except neither…)
Roughly, how much do you spend annually in sport or club membership? _____ euros

B34 Roughly, how much do you spend annually in fitness clothing, equipment and use of sport facilities?
____ euro

B35. When exercising, which of the following devices do you use? Select all that apply.
    1. *Wearable fitness trackers*
    2. *Smartwatches*
    3. *Smartphone fitness apps*
    4. *Headphones*
    5. *Other, specify_____*
    6. *None*

B36. Read the following statements and indicate how often you do the following:
    (1) Never/Rarely (2) Occasionally (3) Often (4) Always
    1. *Look for fitness information on the Internet*
    2. *Read specialised magazines about sports and physical activities*
    3. *Ask fitness trainers for advice on how to improve your workout routines*
    4. *Talk with sporty people about training routines and sports equipment*

B37. How much do you think exercising for physical fitness can improve a person's….?
1. Not at all, 2. A little bit, 3. Quite a bit, 3. Very much
    1. *…chances for a long and healthy life*
    2. *…overall appearance*
    3. *…self-confidence*
    4. *…energy levels*
    5. *…social life*
    6. *…mood and emotions*
    7. *…ability reach and maintain a target weight*
    8. *…mental sharpness*
    9. *…competitiveness*

       For respondents who don't exercise currently or plan to do it in months to come
B38. Below are some reasons people give for not exercising. *Please indicate how strongly*
you agree or disagree with each statement. (1)Strongly Disagree (2) Somewhat disagree (3) Somewhat agree
(4) Strongly Agree
    1. *I really don't enjoy exercise.*
    2. *I'm not sure what kind of exercise to do.*
    3. *I cannot exercise because of health problems.*
    4. *I'm too out of shape to exercise.*
    5. *I could exercise regularly but I am not interested.*
    6. *As far as I'm concerned, I don't need to exercise regularly.*
    7. *I don't have the willpower necessary to exercise.*
    8. *I don't have time to exercise regularly right now.*
    9. *I'm afraid of getting injured.*
    10. *I feel it's too late to start exercising.*
    11. *I have no place to exercise.*
    12. *I feel too self-conscious to exercise.*
    13. *I feel tired or lack the energy to exercise.*
    14. *It costs too much money to exercise.*
    15. *There are no sport facilities or gym close to where I live.*
    16. *I don't like to exercise alone.*
    17. *It is a real hassle to shower or change my clothes to get some exercise.*

BODY CARE PART 2. PHYSICAL APPEARANCE.

B1. How much do you weigh? _____
B2. How tall are you? _____

B3. How much do you agree with the following statements? *(1) Strongly disagree ..... (5) Strongly agree*
1. *At parties or other social events, I compare my physical appearance to the physical appearance of others.*
2. *The best way for a person to know if they are overweight or underweight is to compare their figure to the figure of others.*
3. *At parties or other social events, I compare how I am dressed to how other people are dressed.*
4. *Comparing your "looks" to the "looks" of others is a bad way to determine if you are attractive or unattractive.*
5. *In social situations, I sometimes compare my figure to the figures of other people.*

B4. When you look at yourself in the mirror, how satisfied are with your overall physical appearance?
(1) Very dissatisfied
(2) Moderately dissatisfied
(3) Neither satisfied nor dissatisfied
(4) Moderately satisfied
(5) Very satisfied

B5. How much do you agree with the following statements? *(1) Definitely disagree, (2) Mostly disagree, (3) Neither agree nor disagree, (4) Mostly agree, (5) Definitely agree*
1. *My body is sexually attractive.*
2. *I like my look just the way it is.*
3. *Most people would consider me good looking.*
4. *I like how I look without my clothes.*
5. *I like the way my clothes fit me.*
6. *I dislike my body shape.*
7. *I'm physically unattractive.*

B8 How often do you … *(1) Rarely / Never (2) 1 to 2 times a year, (3) 3 to 5 times a year, (4) 6 to 10 times a year, (5) Once a month, (6) Twice a month, (7) Weekly*
1. *go to the hairdresser / barber?*
2. *go to beauty centres for facial treatments, body waxing, massages and/or nails treatments?*
3. *use face creams, gels, lotions and serums?*
4. *use body creams and lotions?*
5. *use body care products and/or items for hair removal and trimming? (like body creams, shampoo, soap, shaving foams, twisters, razors and scissors)*

LEISURE AND MEETING SPACES

Are you a part of, or are you a member of, any association or group *(e.g. religious, political, sports, etc.)?*
- *Yes*
- *No*
- *I don't know*

Which of the following groups/associations do you belong to or are you registered with and/or participate in their initiatives?
- *University*
- *Social volunteering*
- *Sporting*
- *Recreational*
- *Musical*
- *Cultural*
- *Pacifist, environmentalist, civil rights advocate*
- *Religious*
- *Trade union*
- *Political / Trade union*
- *user and consumer protection associations*
- *other (specify)*

In the last six months, how many times have you: *0. Weekly, 1. Several times a month, 2. At least once a month. 3. Less than once a month. 4. Once in the last six months. 5. Never in the last six months.*
- *visited a museum/exhibition of art*
- *visited a historic building/church/castle*
- *been to the cinema*
- *been to the theatre*
- *been to a concert*
- *attended parties/events in the square*
- *attended parties/events in public places*
- *attended parties/events in private places*
- *eaten in the evening in a pizzeria*
- *eaten in the evening in a restaurant*
- *visited the shops/shopping*
- *visited department stores / Mall*

CULTURAL ACTIVITIES.
Comprehensive questionnaire of cultural practices

PERFORMING ARTS
Amateur practices

Have you done any of the following activities as a hobby during the past 12 months?
(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month; (4) or less Never
- *Acted in a theatre play*
- *Directed a theatre play*
- *Performed as a stand-up comedian*
- *Sung in a choir, a vocal ensemble, opera/operetta/musical troupe, pop- or rock band, rapped*
- *Played a musical instrument*
- *Composed music or performed as DJ*
- *Danced (ballet or modern dance, ballroom dance, Latin American dance, jazz dance, hip hop, break dance, street dance, folk dance)*
- *Did choreography for a dance performance*

Social participation/ volunteering
During the last 12 months… (1) Yes; (2) No
- *Did you voluntary work for your company, ensemble or group? (This also includes taking care of logistics, requisites, costumes, lights, sound etc.)*
- *Did you follow lessons for your activity?*
- *Did you upload either your own performance or performance of your company, ensemble or group on the internet?*

Attending/ receiving
How often did you visit one of the following performances in your own country or abroad (including festivals and other events) during the last 12 months? *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*
- *A theatre play*
- *A cabaret, or a stand-up comedy*
- *A ballet or a modern dance*
- *A concert of classical music*
- *An opera*
- *A musical*
- *A pop or rock concert*
- *A jazz or blues concert*
- *A folk music concert*
- *A world music concert*
- *A concert or a party of urban (rap, hip-hop)*
- *A dance feast or a house party*
- *A concert of popular national or local music*
- *A concert of a singer/songwriter or a chansonnier*
- *A concert of other music*
- *A professional sport event*
- *A amateur sport event*

How often did you view direct broadcast outside home (for instance in open air, a cinema, a public library or another venue) during the last 12 months of: *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*
- *A theatre play*
- *A cabaret, or a stand-up comedy*
- *A ballet or a modern dance*
- *A concert of classical music*
- *An opera*
- *A musical*
- *A pop or rock concert*
- *A jazz or blues concert*
- *A folk music concert*
- *A world music concert*

- *A concert or a party of urban (rap, hip-hop)*
- *A dance feast or a house party*
- *A concert of popular national or local music*
- *A concert of a singer/songwriter or a chansonnier*
- *A concert of other music*
- *A professional sport event*
- *A amateur sport event*

How often, in the last 12 months, did you view and/or listen to the recordings of:
(1) Every day or almost every day; (2) Few times a week; (3) Few times a month; (4) Less than once a month; (5) Never

- *Theatre plays*
- *Cabarets, or a stand-up comedies.*
- *Ballets or a modern dance*
- *Classical music*
- *Opera*
- *Musical*
- *Pop or rock*
- *Jazz or blues*
- *Folk music concert*
- *World music*
- *Urban (rap, hip-hop)*
- *Dance or house*
- *Popular national or local music*
- *A singer/songwriter or a chansonnier*
- *Other music*
- *A professional sport event*
- *A amateur sport event*

ARCHITECTURE, VISUAL ARTS AND CRAFTS
<u>*Amateur practices*</u>

Have you done any of the following artistic or creative activities as a hobby during the past 12 months?
(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month; (4) or less Never

- *Made paintings, drawings, graphical works (by hand)*
- *Made photographs as an artistic hobby (excluding family and/or holiday pictures)*
- *Made sculptures*
- *Made pottery, glass*
- *Made jewels*
- *Made textile works*

<u>*Social participation/ volunteering*</u>

During the last 12 months…*(1) Yes; (2) No*

- *Were you a member of an association, a club or a group of amateur artists or craftsmen?*
- *Did you voluntary work for this association, club or group?*
- *Did you present – alone or with others - own work in an exhibition?*
- *Did you follow lessons for your artistic or creative activity?*
- *Did you upload images of your work on the internet?*

<u>*Attending/ receiving*</u>

During the last 12 months… *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*

- *Did you view paintings, drawings, graphical works, photos, and sculptures, products of crafts or virtual exhibitions of visual arts or crafts (on the internet or other media)?*
- *Did you view or listen to a programme about visual arts and crafts (on television, radio, video, DVD, internet or other media) during the last 12 months?*

HERITAGE
<u>*Amateur practices*</u>

During the last 12 months… *(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month or less; (4) Never*

- *Did you collect any kind of objects as a hobby?*
- *Did you search in archives and/or online for genealogical or historical records?*
- *Did you conduct excavations yourself and/or participate in excavations conducted by professional or other amateur archaeologists?*

Social participation/ volunteering

During the last 12 months… *(1) Yes; (2) No*
- *Were you a member of an association, a group or a club, which supports museum(s)?*
- *Were you a member of a historical or genealogical association, club or group?*
- *Were you a member of an association, club or group for preservation of monuments and heritage?*
- *Did you voluntary work for or donated to a museum?*
- *Did you voluntary work for or donated to a historical or genealogical association, club or group?*
- *Did you voluntary work for or donated to of an association, club or group for preservation of monuments and heritage?*

Attending/receiving

During the last 12 months? *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*
- *Did you visit a museum in your own country or abroad?*
- *Did you visit galleries or exhibitions in your own country or abroad?*

[IF YES…] **What kind of museums, galleries or exhibitions did you visit?** *(Tick all that apply)*
- *Art*
- *Archaeology and history*
- *Natural history and natural science*
- *Science and technology*
- *Ethnography and anthropology*
- *General, mixed*
- *Other*

During the last 12 months… *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*
- *Did you visit monuments, historical or artistic places, famous buildings or archaeological sites in your own country or abroad?*

[IF YES…] **What kind of monuments, places, buildings or sites did you visit?** *(Tick all that apply)*
- *Historic sites (old quarter, monumental city etc.)*
- *Monumental and/or famous buildings*
- *Archaeological sites*
- *Cultural itinerary*
- *Other*

During the last 12 months… *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*
- *Did you visit an archive your own country or abroad?*
- *Did you consult archival records online?*
- *Did you view virtual exhibitions of art or any kind of museum objects (on the internet or other media)?*
- *Did you view monuments, historical or artistic places, buildings or sites (on the internet or other media)?*
- *Did you view or listen to a programme about museums (on television, radio, video, DVD, internet or other media)?*
- *Did you view or listen to a programme about monuments, historical or artistic places, buildings or sites (on television, radio, video, DVD, internet or other media) during the last 12 months?*
- *Did you visit a zoo or animal park?*
- *Did you visit a natural reserve?*

BOOKS AND PRESS

Amateur practices

During the last 12 months… *(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month or less; (4) Never*
- *Did you write any poetry, prose, fiction or non-fiction in your leisure time?*
- *Did you have a blog or an own website on the internet?*

Social participation/ volunteering

During the last 12 months… *(1) Yes; (2) No*
- *Were you a member of an association, a group or a club of (amateur) writers or journalists?*
- *Did you follow lessons on (creative) writing?*
- *Did you send at least one letter to the editor of a newspaper or a magazine?*
- *Did you publish your own work on paper?*
- *Did you publish own work in whatever form on the internet (thus including weblogs, ezines and other internet publications)?*
- *Did you attend a reading circle or a book club?*

- *Did you participate in a reading circle or a book club on the internet?*

Approximately, how many books do you have at home?

• *None* • *1-25* • *26-50*	• *51-100* • *101-200*	• *201-400* • *More than 400*

Attending/receiving

During the last 12 months…*(1) Yes; (2) No*
Did you read a printed book in your leisure time?
Did you read a book in digital form (i.e. on the internet, downloaded from the internet) in your leisure time?

[IF YES…] **Which kind of books did you read?** *(tick all that apply)*
- *Literature & Novels*
- *Science Fiction & Fantasy*
- *Mystery & Thrillers*
- *History*
- *Biographies*
- *Health, Mind & Body*
- *Other kind of boos*

How many books, approximately did you read? |__|__|
(1) At least five times a week; (2) Every week or almost every week; (3) Few times a months; (4) Once a months; (5) Less often; (6) Never
- *Do you read printed magazines and/or periodicals in your leisure time?*
- *Do you read magazines and/or periodicals in digital form (i.e. on the internet, downloaded from the internet) in your leisure time?*
- *Do you read printed newspapers?*
- *Do you read newspapers in digital form (i.e. on the internet, downloaded from the internet)?*

LIBRARIES
Social participation/volunteering
Did you voluntary work for a library during the last 12 months? *(1) Yes; (2) No*

During the last 12 months… *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*
- *How often did you visit a library in your own country or abroad?*
- *How often did you visit a library online and/or search for literature and other material available in a library on the internet?*

FILM AND VIDEO
Amateur practices
Did you make at least one film or one video as an artistic hobby (thus excluding family and holidays films or videos) during the last 12 months?
(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month or less; (4) Never

Social participation/ volunteering
During the last 12 months…*(1) Yes; (2) No*
- *Were you a member of an association, group or club that makes films or videos (including video clips)?*
- *Did you voluntary work for or donated to such association, group or club?*
- *Did you follow lesson for film or video making?*
- *Did you show own film(s) or video(s) to an audience?*
- *Did you uploaded own film(s) or video(s) or films or video of the association, group or club you are a member of on the internet?*

Attending/ receiving

Did you go to the cinema or a film festival in your own country or abroad during the last 12 months? *(1) More than 12 times; (2) 7-12 times; (3) 4-6 times; (4) 1-3 times; (5) Never*
Do you watch films on television, video, DVD or other media? *(1) Every day or almost every day; (2) Few times a week; (3) Few times a month; (4) Less than once a month; (5) Never*
Do you download films from the internet? *(1) Every day or almost every day; (2) Few times a week; (3) Few times a month; (4) Less than once a month; (5) Never*

RADIO, TELEVISION AND INTERNET
Attending/ receiving

On an average week day how long:

	Hours:Minutes
Do you listen to radio (at your home, in your car or elsewhere)?	/_/_/:/_/_/
Do you listen to internet radiobroadcasts (using PC, mp3 player, mobile phone or other media)?	/_/_/:/_/_/
Do you watch television?	/_/_/:/_/_/
Do you watch internet television broadcasts (using PC, mp3 player, mobile phone or other media)?	/_/_/:/_/_/
Do you use internet during your leisure time?	/_/_/:/_/_/

<div align="center"><i>Amateur practices</i></div>

During the last 12 months… (1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month or less; (4) Never
Did you design anything for the internet – i.e. a website, a game, or a blog – as a hobby?

<div align="center"><i>Social participation/ volunteering</i></div>

On an average week day how long:

	Hours:Minutes
Do you use the social media such as Facebook, My Space, LinkedIn, or Twitter?	/_/_/:/_/_/

<div align="center">SPORT AND GAMES PRACTICE
<i>Attending/receiving</i></div>

How often, in the last 12 months, did you:
(1) Every day or almost every day; (2) Few times a week; (3) Few times a month; (4) Less than once a month; (5) Never
- *practicing sports*
- *playing social or group games*
- *playing card/board/computer games*

<div align="center">TRADITION
<i>Attending/receiving</i></div>

How often, in the last 12 months, did you:
(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month or less; (4) Never
- *Wearing traditional dress for community events/celebration*
- *Use of traditional tools for preserving a specific tradition*
- *Participated in activities which help to maintain a specific culture*
- *Taught or learnt indigenous knowledge*
- *Participating in socializing activities*
- *Participating in community celebrations of cultural/historical events*
- *Participating in festivals*

How often, in the last 12 months, did you:
 (1) Every day or almost every day; (2) Few times a week; (3) Few times a month; (4) Less than once a month; (5) Never
- *Taught learnt or playing ritual music*
- *Taught, learnt or prepared traditional food*
- *Participating in community religious rites/events*
- *Participating in community non-religious rites/events*
- *Participating in community social activities*

<div align="center">LANGUAGE
<i>Amateur practices</i></div>

During the last 12 months…
(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month or less; (4) Never
- *Taught or learnt a particular language that contributes to preserve the cultural diversity of a specific community*

During the last 12 months…
(1) Once a week or more often; (2) 2 or 3 times a month; (3) Once a month or less; (4) Never
- *Telling a story/myth/legend to someone*

In your hometown, is there …
a movie theatre?
a theatre?
a concert hall?
an opera house?
a conference hall?

a sports hall?

EATING, COOKING AND SHOPPING HABITS

We would like to study your consumption habits. This section explores your eating routines, cooking habits and competencies as well as your shopping behaviour.

Eating Part 1. Lunch routines.

C1. Think of last week and indicate us when, where and what you had for lunch from Monday to Friday.

	Monday	Tuesday	Wednesday	Thursday	Friday
Skipped lunch					
Eaten lunch at my accommodation/home*					
Had lunch at university canteen					
Lunched at a bar / fast food restaurant / pizzeria					
Prepared and packed lunch at home to eat it at my Department (salad, sandwich, leftovers)					
Had just snacks during lunchtime in my Department (peanuts, chips, chocolates, pastries, crackers…)					
Eaten takeaway meals (e.g. pizza, sandwiches, salads) from supermarkets, bars or fast food shops.					
Don't remember					

*By accommodation/home we refer to the main place where you live during the academic year while attending university for lessons and exams.

C2. *(If Skipped lunch)* **What made you skip lunch last week? Select all that apply**
1. Time constraints
2. Prefer to do other things at lunchtime (going to the library, working out, going for a walk…)
3. Lack of appetite
4. Attempt to lose weight
5. Feeling unwell
6. Not having with whom to lunch
7. Budget constraints

C3. With whom did you eat lunch last week?

	Monday	Tuesday	Wednesday	Thursday	Friday
1. Alone					
2. With house or flatmates					
3. With other university friends					
4. With my parents or other relatives					
5. Don't remember					

Eating Part 2.: Cooking habits and competencies.

C4. Would you say you know how to cook?
  1. *Yes, I know how to cook.*
  2. *Yes, but only basic things.*
  3. *No, I don't know how to cook. (go to part 3)*

C5. How many years have you been cooking? |___|___|
Enter 0 if you have less than a year cooking.

C6. Is there a kitchen in your accommodation/house that you can use? *(only for student that not living with parents/relatives)*
  1. *Yes, there is a kitchen that I can regularly use.*
  2. *Yes, there is one but I don't have regular access to it.*
  3. *Yes, there is a kitchen but I am not allowed to use it at all.*
  4. *No, there is no kitchen.*

C7. How often do you cook a main meal?
  1. *Daily*
  2. *Several times a week*
  3. *Once a week*
  4. *Less than once a week*

C8. Please use the 7-point scale below to indicate your level of agreement with the following statements. *(1) strongly disagree …… (7) strongly agree*
  1. *Cooking makes me happy.*
  2. *Cooking is time consuming.*
  3. *I am good at cooking.*
  4. *Cooking is costly.*
  5. *Cooking helps me eat healthy.*
  6. *Cooking is difficult.*
  7. *Cooking is important to me.*
  8. *Cooking is just a chore I have to do.*
  9. *When cooking, I like to try new recipes.*

C9. When looking for ideas or inspiration about cooking, what are you most likely to do? *Select all that apply.*
  1. *Turn to your family for tips*
  2. *Look online for recipes*
  3. *Look in cookbooks/magazines*
  4. *Use recipe apps*
  5. *Watch cooking shows online or on TV*
  6. *Ask friends for ideas*
  7. *Post questions on collaborative websites (e.g Quora, Yahoo answers, Answers.com)*

Eating Part 3.: Daily diet.

C12. Which of the following applies to you? *(Indicate all that apply.)*
1. *I don't follow a specific diet.*
2. *I follow a vegetarian or vegan diet.*
3. *I avoid certain foods for religious or cultural reasons.*
4. *I avoid or limit my intake of certain foods due to health problems (allergies, gluten intolerance, …).*
5. *I have no health issues but follow a health-food diet rigidly.*
6. *I limit consumption of certain foods to lose/maintain weight.*

C13. Thinking about last week (Monday to Friday), how many times did you include the following food items in your daily diet?,
(1) Never (2) Once (3) Twice during the week (4) Three or four days (5) All five days
1. *Pasta, bread, rice*
2. *Fresh vegetables, fruits*
3. *Plain or low fat milk, yogurt*
4. *Soya-based food (milk, yogurt, tofu)*
5. *Red meat (Beef, veal, pork, etc.)*
6. *White meat (chicken, turkey…)*
7. *Processed meat (ham, bacon, sausages)*
8. *Fish*
9. *Snacks (crisps, chocolates, sweeties, pastries…)*
10. *Pre-processed food and/or frozen pre-processed food (pizza, hamburgers, pasta…)*
11. *Sugary drinks (coke, teas, soda, processed juices)*
12. *Weight-loss pills, teas and products (slim fast, weight watchers, meal replacements)*
13. *Low-sugar or no-sugar drinks (e.g. light/zero coke, sprite zero)*
14. *Home-made food cooked by your parents*
15. *Alcoholic drinks*

C14. Could you please tell us to what extent do the following statements describe you?
(1) Not at all (2) To little extent (3) To some extent (4) To a great extent
1. *For me, eating is a pleasure.*
2. *Eating for me is just a way not to feel hungry.*
3. *I like to try new foods and tastes.*

Eating Part 4: Shop for food groceries.

C15. Last month, how often did you shop for food groceries?
1. *Rarely/Never (go to C20)*
2. *Once every 2 weeks*
3. *Once a week*
4. *A few times per week*
5. *Everyday*

C16. Last month, how often did you buy the following grocery food products and supplements:
(1) Never (2) Rarely (3) Often (4) Always
1. *Organic*
2. *Zero-mile*
3. *Weight-loss pills, teas and products - slim fast, weight watchers, meal replacements*
4. *Dietary supplements - vitamins, iron, potassium…*
5. *Frozen items*
6. *Allergen-free products - gluten free, lactose free*
7. *Ready meals - to be just heated or defrosted in microwave/oven*

C17. How much time do you spend shopping for your food groceries? *Do not include the time to get to and from the store.*
1. *Little time, I shop as quickly as possible.*
2. *Time enough to find all I need.*
3. *More time than the strictly necessary.*

C18. How often did you shop at the following super/markets last month?
(1) Never (2) Rarely (3) Often (4) Always
1. *Specialised food shops (fishery, butchery, bakery, fruit and vegetable shops)*
2. *Organic Shops (e.g. NaturaSì, L'Origine…)*
3. *Supermarkets*
4. *Street markets*

C19. Last month, do you most often shop for your groceries ...? *Select only one option.*
1. *...alone*
2. *...with housemates*
3. *...with friends*
4. *...with family members*

Eating Part 5: Shopping behaviour.

C20. How often did you go out shopping?
1. *Rarely/Never* **Filter go to c22**
2. *A few times per year*
3. *Several times per year*
4. *A few times per month*
5. *Every week*

C21. Below there are a number of statements regarding general attitudes to shopping (offline). Please read each one and indicate whether you agree or disagree with it.
(1) Disagree strongly (2) Disagree (3) Agree (4) Strongly Agree
1. *Being a smart shopper is worth the extra time it takes.*
2. *Which brands I buy makes little difference to me.*
3. *I take advantage of special offers.*
4. *I like to buy new brands.*
5. *I like to shop around and look at displays.*

C22. How often do you shop online?
1. *Never (Filter go to c24)*
2. *Occasionally*
3. *Often*
4. *Very often*

C23. Below is a list of statements regarding some general attitudes to shopping online. Please read each one and indicate your degree of agreement with it.
(1) Disagree strongly (2) Disagree (3) Agree (4) Strongly Agree
1. *Online shopping is fun.*
2. *Online shopping makes it easy to compare with similar products.*
3. *Shopping online makes me pay more attention to products specifications (e.g. origin, contents, durability).*
4. *Online shopping has a wider variety of products than offline shopping.*
5. *Online shopping has cheaper goods.*
6. *Online shopping saves time and energy.*
7. *Online payments are secure.*
8. *Other costumers' reviews help me to choose.*

WORK ACTIVITY

Do you currently do any work, including occasional work?
- *Yes*
- *No*

Have you still been working in the last six months?
- *Yes*
- *No*

On average, how many hours per week do/did you work?
- *Less than 10 hours*
- *10-20 hours*
- *20-30 hours*
- *more than 30 hours*

Did this job allow you to attend classes?
1. □ *Yes, all of them*　　2. □ *Yes, most of them*　　3. □ *Yes, some of them*　　4. □ *No*　　　99. □ *I didn't have lessons*

In your main job are/were you …
1. *…an employee,*
2. *self-employed,*
3. *or, working for your own family's business?*
7. *(Refusal)*
8 *(Don't know)*

Do/did you have a work contract of…
1. *…unlimited duration,*
2. *or, limited duration,*
3. *or, do/did you have no contract?*
7. *(Refusal)*
8 *(Don't know)*

[IF employee] ***Including yourself, about how many people are/were employed at the place where you usually work/worked…***
1. *…under 10,*
2. *10 to 24,*
3. *25 to 99,*
4. *100 to 499,*
5. *or, 500 or more?*
7. *(Refusal)*
8. *(Don't know)*

[IF self-employee] ***How many employees (if any) do/did you have?***
WRITE IN number of employees: |__|__|__|__|__|
(Refusal) 77777
(Don't know) 88888

In your main job, do/did you have any responsibility for supervising the work of other employees?
1. *Yes*
2. *No*
7. *(Refusal)*
8. *(Don't know)*

How many people are/were you responsible for?
WRITE IN number of employees: |__|__|__|__|__|
(Refusal) 77777
(Don't know) 88888

I am going to read out a list of things about your working life. Using this card, please say how much the management at your work allows/allowed you…
Answer: *from (1) I have/had no influence TO (10) I have/had complete control; (77) Refusal; (88) Don't know.*

…to decide how your own daily work is/was organised?
…to influence policy decisions about the activities of the organisation?

What are/were your total 'basic' or contracted hours each week (in your main job), excluding any paid and unpaid overtime?

    WRITE IN |__|__|__|

    555 (Do not have set 'basic' or contracted number of hours)
    777 (Refusal)
    888 (Don't know)

Regardless of your basic or contracted hours, how many hours do/did you normally work a week (in your main job), including any paid or unpaid overtime.

    WRITE IN |__|__|__|

    777 (Refusal)
    888 (Don't know)

What does/did the firm/organisation you work/worked for mainly make or do?

    WRITE IN _____

Which of the types of organisation on this card do/did you work for?

    01. Central or local government
    02. Other public sector (such as education and health)
    03. A state-owned enterprise
    04. A private firm
    05. Self-employed
    06 Other
    77. (Refusal)
    88. (Don't know)

What is/was the name or title of your main job?

    WRITE IN _____

In your main job, what kind of work do/did you do most of the time?

    WRITE IN _____

What training or qualifications are/were needed for the job?

    WRITE IN _____

In the last 10 years have you done any paid work in another country for a period of 6 months or more?

    1. Yes
    2. No
    7. (Refusal)
    8. (Don't know)

PSYCHO-SOCIAL PROFILE

(BIG Five)

Describe yourself as you generally are now, not as you wish to be. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are and roughly your same age. Please use the scale below to rate how accurately each statement describes you. *1. Very Inaccurate, 2. Moderately Inaccurate, 3. Neither Accurate Nor Inaccurate, 4. Moderately Accurate, 5. Very Accurate*

- *Am the life of the party*
- *Sympathize with others' feelings*
- *Get chores done right away*
- *Have frequent mood swings*
- *Have a vivid imagination*
- *Don't talk a lot*
- *Am not interested in other people's problems*
- *Often forget to put things back in their proper place*
- *Am relaxed most of the time*
- *Am not interested in abstract ideas*
- *Talk to a lot of different people at parties*
- *Feel others' emotions*
- *Like order*
- *Get upset easily*
- *Have difficulty understanding abstract ideas*
- *Keep in the background*
- *Am not really interested in others*
- *Make a mess of things*
- *Seldom feel blue*
- *Do not have a good imagination*

(Procrastination Syndrome)

To what extent do you identify in the following statements? *1 "Not at all" to 5 "Completely".*

- *I delay tasks beyond what is reasonable*
- *I do everything when I believe it needs to be done*
- *I often regret not getting to tasks sooner*
- *There are aspects of my life that I pull off, though I know I shouldn't*
- *If there is something I should do, I get to it before attending to lesser tasks*
- *I put things off so long that my well-being or efficiency unnecessarily suffers*
- *At the end of the day, I know I could have spent the time better*
- *I spend my time wisely*
- *When I should be doing one thing, I will do another*

(Self-Esteem)

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree with each statement. *(1) Strongly disagree (2) Disagree (3)Agree (4) Strongly agree*

1. *I feel that I am a person of worth, at least on an equal plan with others*
2. *I feel that I have a number of good qualities*
3. *All in all, I am inclined to feel that I am a failure*
4. *I am able to do things as well as most people*
5. *I feel I do not have much to be proud of*
6. *I take a positive attitude toward myself*
7. *On the whole, I am satisfied with myself*
8. *I wish I could have more respect for myself*
9. *I certainly feel useless at times*
10. *At times I think that I am no good at all*

Perceived Stress Scale (PSS)

Indicate the extent to which you are or do not agree with the following statements. *(1. Almost never; 2. Sometimes; 3. Quite often; 4. Very often).*

- *In the last month, how often have you been upset because of something that happened unexpectedly?*

- *In the last month, how often have you felt that you were unable to control the important things in your life?*
- *In the last month, how often have you felt nervous and "stressed"?*
- *In the last month, how often have you felt confident about your ability to handle your personal problems?*
- *In the last month, how often have you felt that things were going your way?*
- *In the last month, how often have you found that you could not cope?*
- *In the last month, how often have you been able to control irritations in your life?*
- *In the last month, how often have you felt that you were on top of things?*
- *In the last month, how often have you been angered because of things that were outside of your control?*
- *In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?*

(Smartphone Application-Based Addiction Scale (SABAS))
Please indicate the extent to which you agree or disagree with the statements below in relation to your smartphone use habits. *(1. Disagree strongly; 2. Disagree a little; 3. Neither agree nor disagree; 4. Agree a little; 5. Agree strongly)*

- *My smartphone is the most important thing in my life.*
- *Conflicts have arisen between me and my family (or friends) because of my smartphone use.*
- *Preoccupying myself with my smartphone is a way of changing my mood (I get a buzz, or I can escape or get away, if I need to).*
- *Over time, I fiddle around more and more with my smartphone.*
- *If I cannot use or access my smartphone when I feel like, I feel sad, moody, or irritable.*
- *If I try to cut the time I use my smartphone, I manage to do so for a while, but then I end up using it as much or more than before.*

(Human Values scale.)

Now I will briefly describe some people. Please read to each description and tell us how much each person is or is not like you. Use this scale for your answer.

1. Very much like me; 2. Like me; 3. Some-what like me; 4. A little like me; 5. Not like me; 6. Not like me at all; 7. (Refusal); 8. (Don't know

	MALE RESPONDENTS	FEMALE RESPONDENTS
BENEVOLENCE		
12. It's very important to him to help the people around him. He wants to care for other people.	**L.** It's very important to him to help the people around him. He wants to care for their well-being. ('care for': here in the sense of actively promote their well-being.)	**L.** It's very important to her to help the people around her. She wants to care for their well-being.
18. It is important to him to be loyal to his friends. He wants to devote himself to people close to him.	**R.** It is important to him to be loyal to his friends. He wants to devote himself to people close to him. ('devote': is intended to convey deep concern for these people and readiness to invest his time, resources and energy in their welfare.)	**R.** It is important to her to be loyal to her friends. She wants to devote herself to people close to her.
27. It is important to him to respond to the needs of others. He tries to support those he knows.		
33. Forgiving people who might have wronged him is important to him. He tries to see what is good in them and not to hold a grudge.		
UNIVERSALISM		
3. He thinks it is important that every person in the world be treated equally. He wants justice for everybody, even for people he doesn't know.	**C.** He thinks it is important that every person in the world should be treated equally. He believes everyone should have equal opportunities in life.	**C.** She thinks it is important that every person in the world should be treated equally. She believes everyone should have equal opportunities in life.
8. It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them.	**H.** It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them. ('different' in almost any way. The key idea is that he sees difference/diversity positively and as something worth learning about)	**H.** It is important to her to listen to people who are different from her. Even when she disagrees with them, she still wants to understand them.
19. He strongly believes that people should care for nature. Looking after the environment is important to him.	**S.** He strongly believes that people should care for nature. Looking after the environment is important to him. ('care for': look after, basically synonymous with 'looking after' in the second sentence)	**S.** She strongly believes that people should care for nature. Looking after the environment is important to her.
23.He believes all the worlds' people should live in harmony. Promoting peace among all groups in the world is important to him.		
29. He wants everyone to be treated justly, even people he doesn't know. It is important to him to protect the weak in society.		
40. It is important to him to adapt to nature and to fit into it. He believes that people should not change nature.		
SELF-DIRECTION		
1. Thinking up new ideas and being creative is important to him. He likes to do things in his own original way.	**A.** Thinking up new ideas and being creative is important to him. He likes to do things in his own original way. (Having new ideas, with an emphasis on the creative side of having them through generating them himself)	**A.** Thinking up new ideas and being creative is important to her. She likes to do things in her own original way.
11. It is important to him to make his own decisions about what he does. He likes to be free to plan and to choose his activities for himself.	**K.** It is important to him to make his own decisions about what he does. He likes to be free and not depend on others. (In the sense of not to have to depend on people)	**K.** It is important to her to make her own decisions about what she does. She likes to be free and not depend on others.
22. He thinks it's important to be interested in things. He likes to be curious and to try to understand all sorts of things.		
34. It is important to him to be independent. He likes to rely on himself.		

STIMULATION

6. He thinks it is important to do lots of different things in life. He always looks for new things to try.	**F.** He likes surprises and is always looking for new things to do. He thinks it is important to do lots of different things in life. (Important for himself (his life) is the focus)	**F.** She likes surprises and is always looking for new things to do. She thinks it is important to do lots of different things in life.
15. He likes to take risks. He is always looking for adventures.	**O.** He looks for adventures and likes to take risks. He wants to have an exciting life. ('exciting' more in the sense of 'exhilarating' than 'dangerous'.)	**O.** She looks for adventures and likes to take risks. She wants to have an exciting life.
30. He likes surprises. It is important to him to have an exciting life.		

HEDONISM

10. He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.	**U.** He seeks every chance155 he can to have fun. It is important to him to do things that give him pleasure. (seeks: active pursuit rather than 'taking every' chance)	**U.** She seeks every chance she can to have fun. It is important to her to do things that give her pleasure.
26. Enjoying life's pleasures is important to him. He likes to 'spoil' himself.	**J.** Having a good time is important to him. He likes to "spoil" himself ('spoil himself': 'treat himself' is another idiom. Strongly negative 'self-indulgence' is not intended.)	**J.** Having a good time is important to her. She likes to "spoil" herself.
37. He really wants to enjoy life. Having a good time is very important to him.		

ACHIEVEMENT

4. It's very important to him to show his abilities. He wants people to admire what he does.	**D.** It's important to him to show his abilities. He wants people to admire what he does. (The idea is to show whatever abilities he has, with no assumption that he actually has great abilities. It is important to him to be perceived as being able. He wants his actions to be admired, not his person)	**D.** It's important to her to show her abilities. She wants people to admire what she does.
13. Being very successful is important to him. He likes to impress other people.	**M.** Being very successful is important to him. He hopes people will recognise his achievements.	**M.** Being very successful is important to her. She hopes people will recognise her achievements.
24. He thinks it is important to be ambitious. He wants to show how capable he is.		
32. Getting ahead in life is important to him. He strives to do better than others.		

POWER

2. It is important to him to be rich. He wants to have a lot of money and expensive things.	**B.** It is important to him to be rich. He wants to have a lot of money and expensive things. ('expensive': in the sense of costing a lot rather than their being 'luxury' items.)	**B.** It is important to her to be rich. She wants to have a lot of money and expensive things.
17. It is important to him to be in charge and tell others what to do. He wants people to do what he says.	**Q.** It is important to him to get respect from others. He wants people to do what he says. (get/have this respect, not deserve respect)	**Q.** It is important to her to get respect from others. She wants people to do what she says.
39. He always wants to be the one who makes the decisions. He likes to be the leader.		

SECURITY

5. It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.	**E.** It is important to him to live in secure surroundings. He avoids anything that might endanger his safety. (In the sense of the surroundings actually being secure, and not that he feels secure)	**E.** It is important to her to live in secure surroundings. She avoids anything that might endanger her safety.
14. It is very important to him that his country be safe from threats from within and without. He is concerned that social order be protected.		
21. It is important to him that things be organized and clean. He doesn't want things to be a mess.		
31. He tries hard to avoid getting sick. Staying healthy is very important to him.		

35. Having a stable government is important to him. He is concerned that the social order be protected.

CONFORMITY

7. He believes that people should do what they're told. He thinks people should follow rules at all times, even when no-one is watching.

16. It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.

28. It is important to him to be obedient. He believes he should always show respect to his parents and to older people.

36. It is important to him to be polite to other people all the time. He tries never to disturb or irritate others.

TRADITION

9. He thinks it's important not to ask for more than what you have. He believes that people should be satisfied with what they have.

20. Religious belief is important to him. He tries hard to do what his religion requires.

25. He believes it is best to do things in traditional ways. It is important to him to follow the customs he has learned.

38. It is important to him to be humble and modest. He tries not to draw attention to himself.

N. It is important to him that the government ensures his safety against all threats. He wants the state to be strong so it can defend its citizens.
('ensures' in the sense of 'guarantees'.)

G. He believes that people should do what they're told. He thinks people should follow rules at all times, even when no-one is watching.
(The idea here is that when someone else tells you what to do in actual interpersonal interaction (implying also that the person has some authority), you should do it.
'rules' in the sense of 'rules and regulations'.)

P. It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.

T. Tradition is important to him. He tries to follow the customs handed down by his religion or his family.

I. It is important to him to be humble and modest. He tries not to draw attention to himself.

N. It is important to her that the government ensures her safety against all threats. She wants the state to be strong so it can defend its citizens.

G. She believes that people should do what they're told. She thinks people should follow rules at all times, even when no-one is watching.

P. It is important to her always to behave properly. She wants to avoid doing anything people would say is wrong.

T. Tradition is important to her. She tries to follow the customs handed down by her religion or her family.

I. It is important to her to be humble and modest. She tries not to draw attention to herself.

EDUCATION

What is the highest level of education you (your husband/wife/partner; father; mother) have/has successfully completed? *ISCED Classification*

000 not completed ISCED level 1

113 ISCED 1, completed primary education

129 Qualification from vocational ISCED 2C programmes of duration shorter than 2 years, no access to ISCED 3

221 Qualification from vocational ISCED 2C programmes of 2 years or longer duration, no access to ISCED 3

222 Qualification from vocational ISCED 2A/2B programmes, access to ISCED 3 vocational

223 Qualification from a vocational ISCED 2 programme giving access to ISCED 3 (general or all)

212 Qualification from general/pre-vocational ISCED 2A/2B programmes, access to ISCED 3 vocational

213 Qualification from general ISCED 2A programmes, access to ISCED 3A general or all 3

229 Qualification from vocational ISCED 3C programmes of duration shorter than 2 years, no access to ISCED level 5

321 Qualification from vocational ISCED 3C programmes of 2 years or longer duration, no access to ISCED level 5

322 Qualification from vocational ISCED 3A programmes, access to 5B/lower tier 5A institutions

323 Qualification from vocational ISCED 3A programmes, access to upper tier ISCED 5A/all ISCED level 5 institutions

311 Qualification from general ISCED 3 programmes of 2 years or longer duration, no access to ISCED level 5 institutions

312 Qualification from general ISCED 3A/3B programmes, access to ISCED 5B/lower tier 5A institutions

313 Qualification from general ISCED 3A programmes, access to upper tier ISCED 5A/all ISCED level 5 institutions

421 Qualification from ISCED 4 programmes without access to ISCED level 5

422 Qualification from vocational ISCED 4A/4B programmes, access to ISCED 5B/lower tier 5A institutions

423 Qualification from vocational ISCED 4A programmes, access to upper tier ISCED 5A or all ISCED level 5 institutions

412 Qualification from general ISCED 4A/4B programmes, access to ISCED 5B/lower tier 5A institutions

413 Qualification from general ISCED 4A programmes, access to upper tier ISCED 5A/all ISCED level 5 institutions

520 ISCED 5B programmes of short duration, advanced vocational qualifications

510 ISCED 5A programmes of short duration, intermediate certificate or academic/general tertiary qualification below the bachelor's level

610 ISCED 5A programmes of medium duration, qualifications at the bachelor's level or equivalent from a lower tier tertiary institution

620 ISCED 5A programmes of medium duration, qualifications at the bachelor's level or equivalent from an upper/single tier tertiary institution

710 ISCED 5A programmes of long cumulative duration, qualifications at the master's level or equivalent from a lower tier tertiary institution

720 ISCED 5A programmes of long cumulative duration, qualifications at the master's level or equivalent from an upper/single tier tertiary institution

800 ISCED 6, doctoral degree

5555 (Other)

7777 (Refusal)

8888 (Don't know)

INTERVIEWER NOTE: *Successful completion occurs when either:*
• a formal certificate is issued after an assessment indicating that the course has been passed;
• a course or period of education is fully attended but no certificate is ever issued;
• a course or period of education is fully attended and a certificate of attendance is issued (and no other certificates e.g. for passing the course are ever issued).

****

ISCED 97 Classification of education by level
Six major levels of educational attainment are defined:
ISCED level 0 – Preprimary education

ISCED level 1 – Primary education
ISCED level 2 – Lower secondary education
ISCED level 3 – Upper secondary education
ISCED level 4 – Postsecondary nontertiary education
ISCED level 5 – First stage of tertiary education (not leading directly to an advanced research qualification)
ISCED level 6 – Second stage of tertiary education (leading to an advanced research qualification)

Co-funded by the Horizon 2020
Framework Programme of the European Union

Origins (Social Class)

When you were 14, did your father/mother work as an employee, was he self-employed, or was he not working then?

Employee
Self-employed
Not working
(Father dead/absent134 when respondent was 14)
(Refusal)
(Don't know)

If 'employee' More precisely he/she is/was a
*1 **High-ranking executive** (such as: high government official, judge, University professor, general or colonel)*
*2 **Senior employee – Manager/official** (such as: director, head researcher in private institutes, serving members of the military forces with a lower rank to a colonel, etc.)*
*3 **Employee with high technical/scientific and professional qualification** (such as: engineer, chemist, physicist, social worker, graduate technician, publicist, etc.)*
*4 **University lecturer***
*5 **Secondary school teacher***
*6 **Primary school or pre-school teacher***
*7 **Employee with high and middle qualification level** (such as: university researcher, expert, surveyor, book keeper, data analyst, bank cashier, chief secretary, public relations agent, professional nurse, archivist, non-commissioned armed forces officer, etc.)*
*8 **Secretary or similar***
*9 **Managerial employee** (front-office worker, telephonist, professional soldier, policeman and/or similar with an inferior rank to non-commissioned officers, etc.)*
*10 **Salesman or similar***
*11 **Worker in services** (such as: barman, waiter, chef, deliveryman, domestic helper)*
*12 **Foreman or supervisor***
*13 **Skilled worker or similar***
*14 **Unskilled worker***
*15 **Agricultural worker** – farm labourer*
*16 **Other position as employee** (_____)*
17 I don't know

IF ['self-employed worker'] More precisely he/she is/was a:
*1 **Entrepreneur, managing director**, (banker, executive in big business) with more than 14 employees*
*2 **Freelance worker***
*3 **Self-employed worker/ artisan** with 1-14 employees*
*4 **Self-employed worker/ artisan** without employees*
*5 **Occasional self-employed worker***
*6 **Self-employed worker without specific qualification** (such as: conveyer, driver, itinerant salesman)*
*7 **Tenant farmer or similar** with 1-14 employees*
*8 **Tenant farmer or similar** without employees*
*9 **Family helper in industry and services***
*10 **Family helper in the agricultural sector***
*11 **Member of a Cooperative company***
*12 **Other position as self-employed worker** (_____)*
13 I don't know

****

Which of the descriptions on this card best describes the sort of work he did when you were 14?
*01 **Professional and technical occupations** such as: doctor – teacher – engineer – artist – accountant*
*02 **Higher administrator occupations** such as: banker – executive in big business – high government official – union official*
*03 **Clerical occupations** such as: secretary – clerk – office manager – book keeper*
*04 **Sales occupations** such as: sales manager – shop owner – shop assistant – insurance agent*
*05 **Service occupations** such as: restaurant owner – police officer – waiter – caretaker – barber – armed forces*
*06 **Skilled worker** such as: foreman – motor mechanic – printer – tool and die maker – electrician*
*07 **Semi-skilled worker** such as: bricklayer – bus driver – cannery worker – carpenter – sheet metal worker – baker*
*08 **Unskilled worker** such as: labourer – porter – unskilled factory worker*
*09 **Farm worker** such as: farmer – farm labourer– tractor driver– fisherman*

77 (Refusal)
88 (Don't know)