

MAKING GOOD CHOICES: AN INTRODUCTION TO PRACTICAL REASONING

CHAPTER 2. AGENTS AND GOALS

Practical reasoning is reasoning that results in a decision what to do. If practical reasoning is done well, the decision will be a rational choice. Practical reasoning is done by an agent in order to achieve a goal. In this chapter the concepts of agent and goal are discussed, and methods of goal identifications and analysis practiced.

2.1 Agent: an agent is any entity making a decision. The kinds of things that can be agents are the kinds of things that can make choices – such as a human being, a club, a corporation, an institution, a government. Perhaps a computer can be an agent, and in certain situations, perhaps non-human animals can be viewed as agents. An agent, in this sense, is anything that is organized or formed so that it can function as a single unit attending to its own welfare or promoting some good by setting goals and attempting to reach them in ways that require decisions. Certainly there are human beings who are agents, but there are many non-human agents (e.g., a government or a religion or a business is not a human being but is an agent, under this definition). Note that “agent” is here defined in terms of reasoning (making decisions) and having goals, we do not define an agent in terms of performing actions. In our sense, an agent can have a goal and can decide how best to achieve it, but never act (for example, the agent might get others to act on its behalf, or have a robot perform the behavior required to achieve the goal). The decisions of agents are divided into two kinds: individual choices and social choices.

2.1.1 Individual decision: An individual decision is a decision an agent makes as an individual, not as a group. An individual decision is not a collective decision; that is, it is not a decision that results from summing up the decisions of other agents. We are accustomed to

thinking of a lone human being as an individual agent who makes decisions to further his or her own welfare; we might not be so accustomed to think of a club, or a whole corporation, or an entire nation as a single individual. Nevertheless, such agents make individual choices; that is, decisions intended to gain the goals of the club, or corporation, or nation thought of as a single individual, rather than thought of as a group. Even though individual decisions are intended to promote the goals of the agent taken as an individual, other people or organizations might be affected by the decision. For example, an individual agent could be making a choice on behalf of other people, or perhaps to benefit an organization or institution. But this would still be an individual decision insofar as the decision was not a collection of separate decisions of other agents. In the theory of rational choice the study of the decisions of individual agents, individual decisions, is called **individual decision theory**.

Fiduciary: sometimes individual agents make decisions in special situations functioning as fiduciaries. The decisions are not made for the personal goal of the fiduciary, but for the goal of a client. Lawyers, trustees, or financial institutions that make decisions on behalf of clients are examples. Fiduciaries nevertheless count as individual agents because they in effect take on the client's goal as their own (at least in theory that's what they should be doing).

2.1.2 **Social choice:** A social choice is a decision a group makes based on the separate decisions its members make. Agents are often members of a group and make decisions that are intended to promote the common interests, the common goal of the group. These decisions of the members are then collected or pooled together to arrive at a collective decision; each agent's decision contributes to a collective decision process going on in a group to which each belongs. The process of voting is a prime example of a social choice. By voting, each member of a group contributes a decision to a collective group choice. The members' separate decisions are transformed into a group choice according to a rule such as the principle of majority rule: the choice the group as a whole makes will depend on the choices that the majority of its members make. A social agent, then, is an agent thought of as part of a whole, not a whole, and typically

the other parts that make up the whole group are also social agents engaged in the same decision process. Each agent's decision is intended to promote the goal or the interest that the members of the group have in common; an agent's personal goal is promoted only because the agent is a member of the group. Even if a social agent is making a decision out of pure self-interest, even if a social agent is thinking selfishly, by the nature of the decision situation the agent's decision contributes to promoting the common good of the group. The goals of the separate member agents become furthered only indirectly, namely, by being members of the group and being affected by the group's choice. In the theory of rational choice the study of the decisions member agents make as contributions to their group's decision is called the **theory of social choice**.

Discussion: You would be right if you feel that the difference between individual choices and social choices is not clear. Suppose a club has members who must vote a club president into office; this would be an example of a social (group) choice, each member who votes acting as a social agent. But that same club deciding say to participate in a parade counts as an individual decision, for the entire club now functions as a single agent. An agent deciding what to have for dinner is making an individual choice. But an agent who decides to marry someone contributes to a social choice, for the decision is intended to contribute to a group (the couple deciding to marry) decision, and can affect the agent only as a partner to the marriage. What about a parent deciding what her family will have for dinner? This counts as an individual choice made by the family viewed as an individual agent (as represented in the person of the parent who has the power to decide things such as dinner). But if a family is to decide what to have for dinner by having family members vote or by a discussion among its members that leads to a consensus, then each family member is contributing to a social choice, not an individual choice, providing the family's decision about dinner is based on the members' separate decisions. Similarly, the head of a corporation deciding to hire an accounting firm counts as an individual choice made by the corporation acting as an individual agent. But this corporation might also be viewed as a collection of divisions or departments. If an accounting firm for the whole

corporation is to be hired as a result of somehow summing up the decisions of each division or department in the corporation, then each division or department is a social agent contributing to a social choice. As these examples show, the difference between an individual choice and a social choice often depends on how we are conceiving the agent, or how the agent is functioning, in making the decision – as an individual or as a group of individuals.

It might help clarify the distinction between individual and social choices if we consider what counts, in this context, as a group. First, a group must contain more than one agent – no matter what is being considered an individual agent, be it a single person, an institution, or a nation. Second, these individual agents must relate to the group as parts or members; they must belong to the group by whatever standards the group uses to qualify or confer partnership or membership status. The members of a group need not be located near each other, associate with each other, or even know of each other for that matter, as would be the case, say, with most citizens of a country. Third, and most important, the members of the group must share a **common interest**; that is, the members understand that, as members, their individual goals and the group goals overlap. Having a common interest is something more than two or more individuals just having an **interest in common**; any two individuals can have the same interests in common. Two teams, each competing in two different sports events, have an interest in common: each team wants to win its event. Any two people who happen to like the same music have an interest in common. But it does not mean that either the two teams or the two music fans have any common interests. To have common interests, members must (i) understand that as members of the same group the group's goals cannot be separated from the individual's goals, and (ii) each member must take an interest in each member having this understanding. As members of the same group, they want the object of interest for each other (the object that if attained will affect all who have it in common), and further want each other to want the object of interest for each other. A crowd of people do not necessarily form a group, in this sense, because they might not have a common interest, even though there may be an interest they all have in common which brought them together into a crowd. But, for example, a married couple

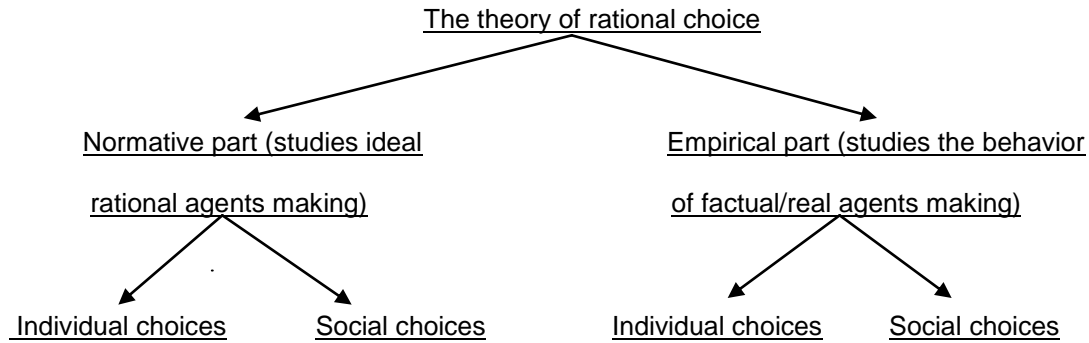
would be a group if each partner cared about their marriage, and each cared that the other cared about their marriage. A social choice, then, in contrast to an individual choice, is a decision made relative to a common interest. A social agent makes a decision as a member of a group with the understanding that the outcome intentionally and inevitably affects all (or at least other) members of the group.

2.1.3 In addition to dividing agents into those making individual decisions and those making social choices (and dividing the theory of rational choice into individual decision theory and social choice theory), agents are also classified as ideal or as real. An ideal agent is an abstraction, a perfect practical reasoner making a variety of perfect decisions. A real agent, in contrast, is an actual person or group facing a real decision. Real decision makers are studied by empirical disciplines like psychology and behavioral economics, disciplines that have an interest in decision making from a factual point of view, and seek to contribute their findings about practical reasoning to empirical parts of rational choice theory. Real people making real decisions might be expert decision makers in specialized fields like medicine or law or the military. But they can also be average, ordinary people (often they are student volunteers) engaged in practical reasoning and making decisions in carefully designed experiments. Both categories of real agents, the expert and the ordinary decision maker, are of interest to discover how agents actually make choices. However, to answer the normative question how a decision *ought* to be made if it is to be a rational choice, as opposed to the empirical question how in fact people go about making decisions, researchers examine the decisions of **ideal rational agents**, perfect practical reasoners.

2.1.4 This 4-fold division of agents into individual vs. social and ideal vs. real is reflected in specialized areas of investigation within the theory of rational choice. The normative part of rational choice theory studies the individual and social choices of idealized agents, while the

empirical (the “descriptive,” or “behavioral”) part investigates the individual and social choices of real agents.

Here is one way to form an overview of these divisions:



Here is an alternative way to present the main divisions in the theory of rational choice:

	normative	empirical
individual	normative theory of individual practical reasoning and rational choice	empirical theory of individual practical reasoning and rational choice
social	normative theory of rational social choice	empirical theory of rational social choice

Because our approach to practical reasoning in this text is normative (how decisions ought to be made) and not empirical (how decisions are made), we will be examining patterns of practical reasoning and the decisions of ideal rational agents. Such agents are the main focus of a philosophic study of practical reasoning and decision making. Also, we will be limiting our focus to practical reasoning in individual decisions; we will not be looking into the important and interesting field of social choice theory. So, this text and the decision making skills you will be gaining are located on the left-left branch of the first diagram, or (equivalently) stays within the upper-left box of the second diagram.

2.2 **Goal:** a goal is anything an agent desires to achieve, and for whose achievement the agent must make a decision. We will accept that goals are set for an agent by the agent's subjective value system; that is, by what the agent wants or desires. Note that by this definition goals are not decided on by an agent, they are not the result of practical reasoning. Whatever the agent is reasoning practically about in order to reach a decision cannot, by this definition, be considered a decision about what goal to achieve; the reasoning is about the means by which a goal is to be achieved. Goals, in this sense, are treated as givens, and practical reasoning starts once there is a goal but not before (see Chapter 1, assumption 5).

The agent's goal has a basic place of priority in decision making, for without a goal no decision is necessary and without a decision there is – by the above definition – no agent. We note again that in the study of (instrumental) practical reasoning, goals are not subject to evaluation as good or bad, worth going after or not worth going after, rational or irrational, (but would be so evaluated in other areas of philosophy such as ethics, and in other fields such as religion, politics, and social theory). And – a point that will be repeated several times throughout this text – we must be very careful not to think that a decision is good *because* it achieves a goal that has been independently evaluated as good; this false claim “a good decision is one that achieves a good goal” is a version of the false principle that the end justifies the means.

2.2.1 An important property of a goal is its relative complexity. Some goals can be achieved all at once and are, so to speak, without parts. An agent whose goal is to remain standing up, as opposed to sitting down, can achieve this simply by not doing anything else. An agent whose goal is to keep quiet, say as a participant in a discussion that is becoming too heated, achieves this simply by refraining to talk. These are examples of relatively simple goals – not that they are easy to achieve, rather they don't have any parts or complexity. Most goals, however, are complex to a degree that an agent can only achieve them in parts. Take a goal with 5 parts, a to e: G (a,b,c,d,e). It might be the case that an agent can achieve G only by achieving first a, then b, then c, and so on until all part are achieved. For example, suppose an agent's goal is: a clean

bedroom. The 5 parts might be: (a) throw out old food and empty bottles, (b) pick up clothes, (c) make the bed, (d) sweep the floor, and (e) put books back on the bookshelf. Once these 5 parts have been achieved, the agent considers the goal of a clean dorm room to have been achieved.

When a goal has complexity, then its parts are **objectives** for the agent whose goal it is.

Objectives are to a goal as parts are to a whole. A **simple goal** is a goal that an agent can achieve by achieving one objective, for that objective equals the goal. But if an agent can achieve a goal only by achieving two or more objectives, the goal has a degree of complexity and the agent has a **complex goal**.

2.2.2 Practical reasoning, the mental process of coming to a decision about what to do, begins with the agent's goal. Recall that a **goal** is defined very broadly: it is anything an agent desires to achieve and for whose achievement an agent must choose what action to do. Once an agent has a goal, the methods of practical reasoning and standards of rational choice can be used to arrive at a decision about how best to achieve that goal. Let's look at the broad context within which practical reasoning typically takes place. We can think of this context as unfolding in stages.

1st stage – An agent experiences a new desire or a change in strength of an existing desire. It is not part of the study of practical reasoning to examine what might cause an agent to have a new desire or to experience a change in strength of an existing desire, but we can imagine typical examples. A person's car breaks down, and so now the person needs to get it fixed. A person who felt only slight hunger now begins to feel very hungry, and so the person now wants to eat. A person watches a commercial on TV or hears an advertisement on the radio, and experiences the desire to own or try the product. A business loses an employee, and so will now need to fill the vacant position. A nation's security is suddenly threatened, and now the nation strongly desires to increase its defense system. A school class is given the chance to go on a trip, and so now the class wants to raise money for the trip.

2nd stage – Because of the new desire or change of strength of an existing desire, the agent's subjective value system undergoes change. The agent now perceives that something has value (for the agent) that it didn't have before, or it loses the value it had, or has a greater or lesser amount of value than it did earlier. We can think of this as a shift of the agent's priorities. Now something new is at the top of the agent's priorities; something is now valued by the agent more than the value now given to what had earlier been at the top of the agent's priorities, and so displaces it. The new top priority is the agent's new goal. Keeping to the examples above, it might be getting the car fixed, eating lunch, owning a product, hiring someone, increasing national defense, or raising money for a class trip.

3rd stage – Given the goal, practical reasoning can now begin. The overall task of practical reasoning is to define the goal, form a set of options, and structure these into a decision problem that will allow a rational solution; that is, allow the agent to make a rational choice from among the options as to which is the best way to gain the goal. First and foremost, however, the agent must clearly identify exactly what the new goal is, analyzing its parts and forming criteria by which to judge what course of action will best achieve the goal and by how much.

4th stage – Once the goal has been identified and analyzed, the agent must next discover or create a set of options – actions the agent can do – whose outcomes the agent believes will achieve this new goal, or as much of it as possible. This process of expanding and narrowing options is an important step, for it is hard to make a good decision if some good options are left out of, or some bad ones not eliminated from, consideration. The activity of narrowing one's options, however, is not the activity of discovering which option is best. The former activity is one of forming a set or menu of options; the latter activity is one of evaluating which option from the menu is the rational choice. Forming a set of options, in addition to expanding and narrowing available possibilities, will also involve thinking about the consequences connected to each option, and what part of the consequences counts toward goal achievement. This step will also

involve gathering information about the situation in which the decision will be made, for example: what resources are available to the agent, and what conditions can be expected in which the chosen option will be carried out.

5th stage -- Once a set of options has been formed, the agent next must evaluate, according to a set of criteria, which option (or options if there are more than one) has or can be expected to have maximum utility. This is the option, by definition, most likely to achieve the agent's goal, and it is the rational solution to the decision problem. But is it? The agents should exercise caution and at this stage look for possible ways her practical reasoning might have gone wrong, especially if the agent knows she is prone to certain patterns of poor decision making. Once option evaluation has been completed, practical reasoning is finished with respect to the given decision problem. The agent has now discovered the rational choice. But there is one more stage in the overall context of practical reasoning that should be mentioned.

6th stage -- This last important stage is often hard to do. Now that the agent has discovered what is best to do to achieve the goal, the agent must bring herself to do it (or cause it to get done). *Knowing* what is best to do and *doing* what is best to do are very different things; there seems to be (perhaps fortunately!) a vast territory the agent must cover in order to transform a decision into an action. To actually achieve the goal, the agent must *do* the rational choice, not procrastinate, give in to fear, give in to social pressure, or let any other forces interfere that might sway the agent from doing the rational thing. And if the course-of-action is challenging, the agent must stay-the-course until the agent achieves the desired goal. We will study and practice practical reasoning only up to the point of making a good decision about what to do. In this text we will not be considering those important and mysterious elements having to do with acting on one's decision.

We now turn to the topics of identifying and analyzing the goal. We will not now be concerned with forming and evaluating options; that will come in the next chapter. For now, we'll be

assuming in the examples we'll be using that options are available to agents as needed. Let's look first at identifying a goal. As we proceed, keep in mind assumption 5 from Chapter 1 that goals are identified and analyzed but are not themselves evaluated as good or bad, rational or irrational. In light of this, we will assume that goals have independently been found morally, legally and socially permissible by standards that the agent in question accepts but which lie outside the framework of practical reasoning.

2.3 Goal Identification.

The purpose of identifying the goal is to make it clear to the agent exactly what the goal is. Without a clear goal, an agent is not able to discover which option is the best means to achieve it. Here is an example illustrating this point.

Suppose that you have just graduated from college and your goal is: get a good job. After many interviews and on-site tours, you are offered three jobs each having three features or attributes that have impressed you.

- 1) One job has a generous starting salary, average working conditions, but poor promotion and job experience opportunities.
- 2) The second job has wonderful working conditions, average promotion and job experience opportunities, but a poor starting salary.
- 3) The third job has fantastic promotion and job experience opportunities, an average starting salary, but poor working conditions.

Which job do you take? This will depend very much on what you, the agent, mean by a goal of "a good job". If you define "good job" by starting salary, then it is rational to pick job #1, and the other two jobs would be poor choices for you. But if you define "good job" in terms of, say, working conditions, then job #2 is the one for you, and taking job #1 would be a bad decision.

Unless you specify what a “good job” consists in for you, you can’t discover which job offer to accept. Suppose that you take “a good job” to be a job with all three attributes; then what do you do? Which job should you accept? Again, notice that merely stating your goal as “get a good job” does not help you with your decision. It makes sense to ask, in this case, “Do I value all three features equally, or is one more important, or can any two of the three outweigh the other?” But if you state your goal only as “get a good job”, no answer to these questions is forthcoming.

The point of this example is very basic to practical reasoning: it is to show that the goal contains important information that must be used in coming to the right decision. Take a moment to impress this upon yourself: unless the goal is clearly identified and defined, the information it contains remains buried and cannot help the agent discover which option is the best means to achieve it. Without goal identification, in a very real sense the agent does not know what the goal is, and at best has only a vague idea that will not provide a firm enough basis for a good decision.

A goal is identified by describing it in a clear statement. There are three conditions that a goal statement should satisfy to assure that the goal is sufficiently clear to the agent.

1) The goal statement should make it clear who the stakeholders are.

A **stakeholder** is any intended beneficiary of a decision. Any person, organization, or institution in whose interest a decision is made has a stake in the decision and thus a stake in how much the goal is achieved. Because stakeholders are intended beneficiaries, their welfare must be at least part of the agent’s goal if not the whole goal. The agent can make this known to the stakeholders or keep it secret (as when you buy a surprise gift for someone). Either way, the persons or organizations are stakeholders in the decision, whether they realize they are or not. A decision intended to benefit the agent alone is a decision done out of self-interest. The decisions of fiduciaries are made in the interest of the clients. A decision might be made in the national interest, in which case the nation or (the majority of) its citizens are stakeholders.

However, if people benefit as an unintended consequence of a decision, they are not considered stakeholders. Stakeholders are *not* all those people, organizations, or institutions positively affected by a decision, or negatively for that matter. Rather, stakeholders are all and only those that the agent intends to benefit by the decision.

Stakeholders, as the intended beneficiaries, can rightfully claim to have an interest that the decision be a good one. Now, it may turn out that a decision goes wrong and the stakeholders are harmed; meanwhile, as an unintended consequence some unknown people are benefited by the decision. But the goal statement is not expected to make it clear who is *actually* benefited by the decision, it must only make clear those whom the decision is intended by the agent to benefit given that stakeholders are connected in an important way to the agent's goal. Look back at the example above where the goal was vaguely stated as "get a good job". Who is this supposed to benefit: the agent's children, the agent's college that provided the education and training, the employer, is the job intended to make the agent's parents proud, or is it for the agent's benefit alone? We can't tell simply from the description "get a good job". To make the goal clear, the stakeholders must be clear; the goal statement should not leave us wondering who the stakeholders are.

2) The goal statement should make it clear what part of the consequences of an option is to count as outcome and what part is to count as non-outcome consequences.

The **outcome** is the sub-set or the part of the anticipated consequences of an option that actually affects the goal. Of all the possible consequences that could result from a doing a course-of-action, some will have a special relation to the agent's goal: they might gain the whole goal or at least part of it, promote it in some fashion, or brings the agent closer to achieving it. On the other hand, they might threaten the goal, cause the agent to lose part or all of it, or distance the agent from achieving it. The first can be thought of as positive and second as negative outcomes. A positive outcome is often referred to as the "desired outcome" or the

“intended outcome”, for if an agent desires the goal and intends to achieve it then the agent will desire and intend the outcome of the option that gains the agent that goal.

Something must divide the total consequences of an option into two categories: outcome and other. The goal statement has the job of accomplishing this division. Consider this example: You have decided to drink a glass of juice and there are three consequences from doing so: (a) you have an intake of liquid, (b) you dirty a glass, and (c) you finish a container of juice that had only one glass left. Depending on your goal, these three consequences would divide into outcome vs. other along different lines. If the goal was to quench your thirst, then (a) is outcome, and (b) and (c) are non-outcome consequences, for only (a) works toward achieving the goal. But suppose your goal was to finish the juice, say before it turned sour. In this case only (c) is outcome. Take another example. Suppose you want to buy a new pair of skis and you state your goal as: get new skis for myself. By adding “for myself” to your goal statement, it is clear who the stakeholder is. But it is still a poor goal statement because from all the consequences that result from your buying a new pair of skis, it is not clear what part is outcome. Is the goal simply to own something new? Is it to impress friends? Is it to motivate yourself to get more exercise? Is it to learn how to ski? Such questions can go on and on, because the goal statement “I want to get new skis for myself.” does not contain enough information to divide the large number of consequences resulting from buying new skis into outcome and other. What would a better goal statement be? How about this (for example): “I want to replace my old skis with a new pair in order to get the latest high-tech advantage for myself in the annual local ski race.” This is much better. We can clearly tell, for example, that the money for the new skis you will give to your uncle who (let’s suppose) owns the ski shop where you plan to buy them belongs in the category of costs, not the category of outcome (which it would have had your goal been financially to help support your uncle’s ski shop).

3) The goal statement should make it clear whether the goal has intrinsic value or relative value for the agent.

Most goals have relative value; that is, we value them relative to something else. For example, it is quite common that a goal is a means to further goals, and these in turn are means to even longer-term goals. An agent might desire G1 in order to get to G2, and G2 in order to get to G3, and so on. Perhaps you desire to take a certain college course in order to be able to major in something, and you desire to major in something in order to get a college degree in a certain field, and you desire a college degree in that field in order to land a certain kind of job, and this in order to support a certain quality to your life, ..., and so on. Here the shorter-term goals are valued as stepping stones to longer-term goals; they have in this regard relative value for the agent.

There are goals, however, that are valued purely for their own sake. Someone might desire to own a rare stamp or a certain work of art not because it can be resold for a profit, but just to have it. A person might desire to marry someone not in order to have children, or to satisfy social expectations, but because that person has special value and attraction independent of anything else. Someone may desire to research a topic or solve a puzzle not because the knowledge is useful in any way, but – simply out of curiosity – the agent finds it interesting in and of itself.

The goal statement should make it clear when a goal is a means (has relative value for the agent as in the first set of examples), and when it is an end (has intrinsic value for the agent as in the second set of examples). And in the typical case when a goal is a means, the goal statement should say what the goal is desired for. It should make the answer to this question clear: For what is this goal being valued? By requiring that the goal statement make it clear whether the goal is of intrinsic or relative value for the agent, the agent is required to think about three things. First, the agent becomes aware to what the value is relative in the case of goals of relative value. Second, when the goal is a means to an overall end, if the agent makes a decision that ends up losing the goal, the agent's longer-term goal is not necessarily lost for there may be other means to that same longer-term end. Third, as we will see in later chapters

relative value is subject to certain kinds of distortion (over- or undervaluing) and a clear goal statement will help an agent avoid these value distortions.

EXERCISE:

1) For each of the following goal statements, which of the above three conditions are violated, if any? How would you rewrite these goal statements so that they satisfy all three conditions?

The first (a) is an example:

a) Corporation XYZ states: Our goal is to increase profits by 10% for the next year.

(i) stakeholders are not clear (who is to benefit from increased profits?)

(ii) outcomes of options are clear (only profit increases are outcomes)

(iii) not clear if this goal is a means to something else or an end

Rewrite: To better serve our customers, our goal is a 10% increase in profits for next year to allow us to expand our product line. (This goal statement makes the stakeholders clear: they are Corporation XYZ's customers. It is clear that the goal of a 10% increase in profits is a means to an end.)

b) On a letter of application, a job candidate writes: For many years my goal has been to work in your Company.

c) The team captain is interviewed by a local reporter and says: The Panthers have just one goal – to win big.

d) The Vice President of a country announces: The President desires, in the national interest, a different economic policy so that inflation can be brought under control.

e) A retired worker says: Now I want to go back to college full-time and get a Masters Degree in Art History, a subject I have always loved.

f) Someone shopping for a hybrid car tells the salesperson: My goal is to own a very low-polluting vehicle to help in my small way reduce global warming.

2.4 Goal Analysis.

The purpose of analyzing the goal is to form a set of criteria to be used to evaluate which option is the best means to achieve the goal – criteria, that is, that will allow the agent to discover which option in the menu of options is the rational choice. How to form criteria from an analyzed goal will be explained and practiced in the next chapter. Here we will set up a system for analyzing goals, and practice analyzing some sample goals using this method.

A goal is analyzed in two steps: first, by listing the objectives an agent must achieve to achieve the goal; second, by ranking these objectives. One way to view goal analysis is to think of a goal as a whole and the objectives as parts of the whole. For example, if your goal is to eat a nutritionally balanced meal, then you will achieve this by eating a certain amount of protein, a certain amount of carbohydrates, a certain amount of green vegetables, etc. at one meal according to your particular nutritional needs. If your goal is to achieve a college degree, then you will do this by taking 120+ credits of college level courses, maintaining a passing GPA, paying the required tuition and fees, etc. at a college or university. If you are planning a long road trip with a friend and your goal is to get your car in good condition for the trip, then you achieve this goal by getting, say, your noisy transmission fixed, getting a new set of tires,

replacing the muffler, getting the engine tuned up, etc. These are examples of complex goals, goals that have parts each of which the agent must accomplish in order to reach the goal. A goal is no more and no less than the sum of its objectives. So, in analyzing a goal all objectives must be listed and nothing must be listed that is not an objective. Let's look at this point carefully.

2.4.1 Listing objectives

There are four important conditions that a list of goal **objectives** must satisfy in order for the second step, ranking objectives, to come out right.

1) Objectives are, taken together, sufficient for a goal to be achieved. By definition, when the objectives are achieved the goal is achieved for objectives are parts of a goal. The list of objectives, then, should not contain anything extra or superfluous, for it will be irrelevant. An irrelevant item in the list of objectives will end up, when we later rank objectives, receiving value it should not have, and robbing value from legitimate objectives.

Caution! It is easy to confuse an objective with a preliminary preparation step. Objectives are parts of the goal; achieving an objective must achieve some part of the goal. Objectives are not things an agent has to do in preparation to be able to achieve the goal, they are not a set of plans or a "to do" list. Look at example (f) in the above exercise. The goal is to own a very low-polluting vehicle to help reduce global warming. For this agent, a large part of the goal is owning a hybrid vehicle; another smaller part might be keeping the hybrid vehicle well-maintained. But to own a hybrid vehicle, the agent might want to look up consumer test results for various hybrids, and perhaps might make an appointment with the car dealer to test drive a demo model, and might have to take out a car loan or transfer money from a savings account to a checking account. Such activities are preliminary preparation steps to buying a hybrid vehicle but they are *not* objectives, for the agent could do all such preliminary preparation activities and yet not a single part of the goal will have been achieved. Be careful not to confuse objectives with preliminary preparation steps. Here is the test; ask about any proposed objective: if it is

achieved, will a part of the goal be achieved? If you answer: yes, then it is an objective. If you answer: no, then it is not an objective (even if it is a preliminary step, a “to do,” in the agent’s plan about how to achieve the goal).

2) Objectives are each necessary for a goal to be achieved. If any objective is not achieved the entire goal is not yet achieved. Thus, the list of objectives must be exhaustive or complete; none left out. Leaving out an objective will, when we try to rank objectives, result in over-valuation of those on the list, and also result in incomplete goal achievement.

3) Each entry on the list of objectives must be logically independent of the other entries. Each objective is a single part of the whole goal, so once an objective is achieved its part of the goal should be finished. It should not have to be achieved more than once. Thus, entries should not imply or duplicate one another. They must not, for example, be two different names for the same thing, nor should one objective be a broad category that includes another objective. If this happens, an implied or duplicated objective will end up over-valued, and the other objectives under-valued, when we turn to the task of ranking objectives. Also, by requiring that objectives be logically independent we rule out the possibility that two or more objectives are mutually exclusive. Mutually exclusive objectives would mean that the goal harbors an inconsistency, making it incoherent and unachievable. It might be hard for an agent to achieve any two objectives in the goal, but it should not be logically (and therefore practically) impossible to do so. Having mutually exclusive objectives would mean that the goal is logically impossible to achieve. For example, try to achieve this goal: have your cake and eat it too. It is impossible to satisfy both parts of such a goal because these two parts are not logically independent; each logically implies the negation of the other.

4) A simple goal is its one objective. If a goal can be achieved by achieving one and only one objective, the goal is simple. It is a whole having one part. Thus, the list of objectives for a simple

goal must contain just one entry, and it will be the name or description or specify in some way the goal itself.

Here is an example that, in different ways, violates the first three requirements of goal analysis. Suppose an agent desires to have a nice yard for family and friends to enjoy during the summer. The agent lists the following objectives: (a) a well-maintained lawn, (b) nicely painted outdoor furniture, (c) a bed of flowers, (d) evenly cut grass, (e) nicely landscaped hill area, (f) a mown lawn, (g) outdoor tables and chairs protected with new paint, (h) a fence around the flower bed, and (i) all barriers in the yard removed. According to this agent, achieving these 9 objectives equals achieving the goal of a nice yard for family and friends to enjoy during summer; this agent, in effect, defines his goal as equal to these 9 objectives. But notice that there are several problems with this list. First, (d) and (f) are each in effect counted twice, because (a) is a broad category that already includes them. Thus, (a), (d), and (f) are not logically independent of each other. Next, (b) and (g) duplicate each other; they are not logically independent, one is redundant. Third, suppose that the agent did not realize that there is a serious mosquito problem in the yard. With a mosquito problem, the goal is clearly not fully achieved, so the list is not complete. Finally, (h) and (i) are mutually exclusive; the fence and having all barriers removed can't both be achieved. One has to go (let's delete (i)). If we remove these errors, the list of objectives will satisfy the above conditions. The improved list will contain items (a), (b), (c), (e), (h), and the new objective (j) which is to solve the mosquito problem.

EXERCISE:

1) For each goal, its list of objectives violates one or more of the above conditions 1 – 3. Which condition(s) is violated. Explain why.

a) Goal: We want to give our parents a nice surprise party for their 25th wedding anniversary.

Objectives: (i) a party in which there is live music

(ii) a party in which there is dancing

(iii) a party containing their good friends and close relatives

(iv) a party attended by their parents

(v) a party with a live band

(vi) a party not costing more than \$600

(vii) call the caterers well in advance.

b) Goal: I want to earn a Nursing Degree so that I can enter the health service field as a career.

Objectives: (i) complete all required courses in an accredited Nursing Program

(ii) achieve at least the minimum required grade point average of 2.5 in all nursing classes

(iii) pass all the required nursing courses

(iv) take a class in fiction writing, my hobby

(v) apply for a tuition scholarship

c) Goal: XYZ Company's goal is to sell their product in a neighboring country (A) as a way to increase profits.

Objectives: (i) ship our product to outlets in A that will carry this product

(ii) verify that our product passes all official codes and regulations in A that control the product's sales

(iii) secure all licenses and permissions required in A to sell our product

(iv) supply stores in A with our product

(v) find out if there are any other products we make that would sell in A

2) Make up 3 complex goals and for each create a list of objectives that violates one of the above 1 – 3 conditions, but does not violate the other two. Explain why the list is in violation of the given condition.

2.4.2 Ranking objectives

After a list of the goal's objectives has been formed, in keeping with the above four requirements, the agent must next discover how much a part each objective is of the whole goal. The question is: how much of the total goal does a given objective represent? If the goal is simple, the answer is: it represents all of it. But if the goal is complex, then an objective represents only part of the goal and the agent must discover how much of the goal that part is. The full reason why it is important to do this will become clear shortly, but for now think of this possibility. If a goal has two objectives, and one is 90% of the goal and the other is only 10% of the goal, the agent must still accomplish both objectives to reach the total goal. But it might be reasonable to accomplish the more important objective first; or it might be necessary to know about this very unequal 90 -10 division so that a distribution of resources and efforts can be planned accordingly.

Before introducing a method for ranking objectives, let's be sure we understand what it is to rank objectives. Recall that a goal is something the agent desires, and thus values. If objectives are the parts of a total goal, then to desire the whole is to desire its parts. If an agent values the

goal, then the agent must value the objectives by which the goal is realized. Because the whole is just the sum of its parts, the amount of desire the agent has for the goal must be completely distributed among the objectives; that is, the sum of the values of the objectives must equal the value of the goal. Ranking the objectives should tell us how much of the agent's desire for the whole goal each objective has (or should have). In other words: if the value of the goal is to be distributed among the objectives, how should the total quantity of value be divided up among the objectives? This is our question, and the answer depends in large part on the agent's beliefs and desires. What part of the whole goal does the agent believe each objective represents; that is: how important or valuable is each objective to the whole goal. **Ranking** objectives is that part of practical reasoning by which an agent discovers how important each objective is for achieving the goal, according to the agent's own beliefs and subjective values (= desires).

To avoid possible confusion about what ranking objectives is, let us distinguish between two ways of dividing a goal into parts. This dividing might be done by a principle of division that has little or nothing to do with value or importance. For example, we might ask if an objective is a big or a little part of the goal with respect to a quantity like time or effort or cost. Let's look back at some of the above examples. Suppose your goal is to get your car in good shape for a long road trip. The "biggest" objective might be, say, getting the noisy transmission fixed. It will take the longest time to complete of all the objectives. It will cost more than any other objective. It will require the most trouble and effort on your part to get done compared to the other objectives. By these standards, then, you judge this objective the biggest part of your goal. Or take the example of having a nice yard for family and friends to enjoy during the summer. Let's say that the yard has a huge lawn, and so in one sense the largest part of the goal is the objective of a well-maintained lawn. It will take more time and effort to achieve than any other objective. Keeping up the lawn will be the most on-going and absorbing part of achieving the goal of attaining a nice yard. In this sense it is the largest part of the whole goal. However, note how "biggest part" or "largest part" in these examples do not mean "most important" or "most

valuable”; instead, they mean something like “takes most effort” or “will cost most in time or money”.

Now let’s turn away from such principles of division like time or effort that do not involve value and turn to the question of importance. This is a question: which objective has greatest value relative to the value the goal has for the agent? If the agent desires the goal, then which objective receives most of that desire? If the goal is important to the agent, then which objective carries most of that importance? Which has second most importance? Let’s say in the example of getting your car in good shape for a long road trip it is not getting the transmission fixed that is most important but getting an engine tune-up. This is what the agent desires most to have done, given that the agent desires the goal of a car in good enough shape for a long trip. But note that the engine tune-up is not the biggest part of the goal by the standards of time, effort or cost. It is, however, the biggest part of the goal in value or importance to the agent (perhaps because the agent believes her car’s un-tuned engine will be the biggest source of trouble on the trip). Let’s say that in the case of the nice yard, the agent realizes that a nice bed of flowers is the most valuable part of the goal (perhaps because he believes family and friends enjoy a flower garden much more than they enjoy a maintained lawn). So, in these two examples we have the following situation. The largest part of the goal in a non-value sense is not the most important or valuable part of the goal in the agent’s scheme of desires. Conversely, the objective that is the most important part of the goal, in the sense of value, is not the biggest part of the goal in the sense of, say, time or effort or cost. Of course, it often happens that these two kinds of parts of the goal – the division into parts that represent areas of importance, and the division into non-value parts – coincide. But as the examples show, this is not necessarily the case. By ranking objectives, then, what the agent is trying to do is parcel or distribute the value or importance the goal has onto the objectives.

There is a simple three-step method for ranking objectives. Here are the steps. After stating and explaining them, we will work through some examples.

1st) Qualitatively rank the objectives: use qualitative descriptions for objectives. Rate them with words like “most important”, “least important”, “the next smallest part”, “not so necessary”, “this one is a bit more necessary or desirable than that one”, “this one is of equal importance to that one”. This is done from the agent’s own perspective and knowledge. The exact words you use are not important, so long as they carry this information: for each objective, in comparison to the other objectives, approximately what size chunk of the total goal’s value will be achieved if this objective were achieved. Describing this yields a qualitative ranking of the objectives. The agent is free to change and redo the rating as the list of objectives is thought about and re-weighed in the agent’s mind; indeed, for highly valued goals in life, for important decisions, the agent should be re-checking and revising how the goal’s objectives are ranked. This is the most important step in the process, for the qualitative descriptions will contain a lot of the information that the quantitative scales (below) will represent. Note that condition 3) above, that the objectives listed be logically independent of each other, is fundamental to a correct qualitative ranking. Of any two objectives that are not logically independent, at least one will end up with a false over-estimation of its importance. This error will then propagate through the next steps, and every subsequent stage of the decision, which will end up a case of fallacious practical reasoning due to value distortion.

2nd) Ordinally rank the objectives: using the ordinal numbers (1st, 2nd, 3rd, 4th, ... , nth), extract an ordinal rank of the objectives from the verbal ranking. Caution! -- usually 1st means best or highest, but in this process be sure to use “1st” for the *least* important or *smallest* objective. If there are, say, five objectives on the list, the agent must use five ordinal numbers – 1st to 5th – the smallest or least important objective receiving 1st and the biggest or most important receiving 5th. If there are seven, then the most important or biggest objective gets 7th, not 1st. If two or more objectives have equal importance, they receive the same ordinal number. The information from the qualitative rating that the **ordinal ranking** contains, and thus preserves, is the order of value of the objectives, but not the gaps or distances between them.

3rd) Rank the objectives on an interval scale. An interval scale is a range of consecutive cardinal numbers (1, 2, 3, 4, ..., n), starting with 1 and ending with a number that is larger than the number of objectives. If there are, say, five objectives, a scale of (1 – 10) or maybe (1 – 15) will be sufficient. If there are 15 objectives, a scale of (1 – 25) should be enough. The idea behind an **interval rank** is that the intervals, the gap between two numbers (that is, the number of numbers left out between two numbers) will convey the information of relative distance, and this will represent an amount of value. The distance one objective's interval number is from another ordinal next to it (that is, the difference between these two interval numbers) represents the amount or degree of importance the one objective has over the other. The agent should try to capture from the verbal rating the relative distance in importance of the objectives and represent this accurately using numbers from the interval scale. So, the objective that is most important for the goal should get the highest interval number used, (which might but need not be the highest number on the interval scale being used). The objective that has least importance for the goal should receive the lowest interval number used, (which might but need not be the lowest number on the scale). An objective that is a very big part of the goal should get a number high on the scale. An objective that is a small part of the goal should get a low number on the scale. An objective whose importance lies between these two should be assigned a number from the scale that is between the assigned high and the assigned low number. The actual numbers from an interval scale that are assigned to each objective is not crucial, so long as these two conditions are met.

(a) The interval numbers must preserve the order of the ordinal rank. So, if one objective has a higher ordinal scale number than another, it must be given a larger interval scale number than the other.

(b) The gaps or intervals between the interval numbers must preserve the relative degrees of importance that were contained in the verbal rating. For example, suppose a goal is analyzed into three objectives: O1, O2, and O3. On a scale of (1 – 10) let's say the agent assigns O1 the

interval number 2, assigns O2 the number 4, and gives O3 the number 8. By such an assignment of numbers, there are two things this agent is claiming. (i) The degree of importance for my goal that O2 has over O1 is half as much as the degree of importance for my goal that O3 has over O2. (ii) The degree of value that O3 has over O1 for my goal is three times as much as the degree of value that O2 has for my goal over O1. Again, the exact numbers and thus the exact intervals are not crucial. It could well have been $O1 = 3, O2 = 6, O3 = 12$ on an interval scale of $(1 - 15)$, for this claims exactly the same two value spreads that the first assignment claims. Rather, within the interval ranking it is the ratio of differences between the numbers – the comparative intervals between the numbers – that encodes the crucial information that will eventually go into making a good decision. The general idea is that the agent should be attempting to represent on an interval scale how the goal's value is distributed among the goal's objectives.

We will now work through some examples to get the feel of analyzing goals by listing and ranking objectives. Remember that this is to be done according to the agent's own desires and beliefs. We will be imagining an (ideal) agent and putting desires and beliefs into his/her head, but if you were actually the agent and these were your goals, your ranking could be (and probably would be) different. It's not a matter of right or wrong, rather it is a matter of forming a list and a ranking that reflects as accurately as possible the agent's own desires and beliefs, and different agents will naturally have different desires and different beliefs that must be respected. Also, this is a good point to recollect condition 1 in section 2.3 above concerning the importance of making the stakeholders clear. Note in these examples how changing stakeholders could change the ranking (via re-identifying the goal).

Example #1: Let's go back to the agent who desires to have a nice yard for family and friends to enjoy in summer. This is the agent's goal. The objectives are: (a) a maintained lawn, (b) painted outdoor furniture, (c) a nice bed of flowers, (d) fenced area. Let's suppose that these four objectives satisfy the four conditions for a good list stated above in section 2.4.1. The first step is

qualitatively to rate these. The agent looks them over, thinks about her family and friends and what they like to do in the yard in summer. She knows that they all enjoy flowers very much. There are no very young children, so the fence gets low importance (if the area is not fenced and everything else is accomplished, only a small part of the goal will not be achieved). She knows that her family and friends like to sit and talk and have drinks in summer, so painted outdoor furniture must be assigned a pretty big part of the goal. A few friends might like to toss a ball around or engage in activities on the lawn, but the agent believes a well-maintained lawn is not a big factor in their enjoying the yard. This gives the following rating: (a) is not very important, (b) is a very big part of the goal, but not the biggest part, (c) gets top rank, and finally (d) is the smallest part of the goal.

Now we'll translate this qualitative information into a quantitative representation.

	Qualitative rank	Ordinal rank	Interval rank (1 – 10)
(a) maintained lawn	not very valuable	2 nd	4
(b) painted furniture	high value	3 rd	8
© bed of flowers	most valuable	4 th	10
(d) fenced area	lowest	1 st	1

Notice how the interval ranking reflects the agent's beliefs and desires. (b) is almost as important as (c) so the gap between objective (b) and objective (c) is small and both are high on the scale. (c) need not have been assigned the highest scale number of 10, it could have been a 9 or an 8. But then (b) would have to be assigned an appropriately lower high interval number. Likewise, (d) being the least important objective gets the lowest interval ranking; but it need not have been 1, it could just as well been 2 or 3. But then (a), which is not so important for the agent's goal, would have to be raised a few points. The lesson here, to repeat what was said above, is that the actual numbers are not as crucial as are the relative distances – the number of numbers

from the scale that are skipped – for representing the agent’s beliefs and values about how big or small a part of the whole goal each objective is.

Before doing another example, there is a final, somewhat mechanical step to be done with the interval ranking. It is a standard in the theory of rational choice that all numerical representations of information take place between 0 and 1, and that the goal’s value is represented as 1. The reason for this will become clear once we turn to the topic of risk and probability. To make a ranking sum to a fixed number, in our case 1, is called “**normalizing**”. Our last step then is to normalize the interval ranking to 1. To do this, simply add up the interval numbers and divide each interval number by that sum. The new set of numbers preserves all the information contained in the interval ranking. These new numbers will be between 0 and 1, and they will sum to 1.0. So, first add $4+8+10+1 = 23$. Then divide each objective’s interval number by the sum: $(4/23 = .17)$, $(8/23 = .35)$, $(10/23 = .44)$, and $(1/23 = .04)$. The goal of a nice yard for family and friends to enjoy in summer is now worth value 1.0, and here is how much a part of this value each objective is worth for the agent we have been imagining.

- (a) a maintained lawn is worth .17 part of the goal’s value for this agent,
- (b) painted outdoor furniture is worth .35 part of the goal for this agent,
- (c) a nice bed of flowers is .44 part of the goal for this agent, and
- (d) the fenced area is .04 part of the goal for this agent.

These sum to 1.0, which is the total value of the goal. This represents the idea stated earlier that the objectives are together equal to the goal; that is, an agent achieves a complex goal by achieving all of the objectives. This is the idea that the value of the whole is just the sum of the values of the parts.

Example #2: As our next example, take the agent mentioned above whose goal is to get her car in good condition for a long road trip with her friend. What will get the car in good enough condition? The objectives are: (a) getting the noisy transmission fixed, (b) getting a set of new

tires, (c) replacing the muffler, (d) getting the engine tuned up, and let's add (e) getting new windshield wiper blades. The agent knows her car pretty well and has a good idea of the trip she will be taking. Accomplishing these objectives will, to the best of her knowledge, yield her a car in good condition for the trip. But what is the relative importance of these five objectives for her goal? She realizes the tires are very bad and the engine is running very poorly, she has not had it tuned up for several years. These go to the top of her list of objectives and she considers them equally important for the success of the trip. The transmission has been making a slight noise and a reliable mechanic friend told her it will be easy to fix, but would take time and so cost a lot. However, she should not worry if she did not get it taken care of for the trip. The muffler and windshield wiper blades are more of a precaution; neither one is giving trouble now. Of the two, she is more concerned about the muffler. The agent's beliefs and desires give these objectives the following qualitative rating: (a) is not very important, (b) and (d) are equally the biggest part of her goal, (c) is next to lowest, and (e) is the smallest part of the goal. Now we must represent this qualitative information in a quantitative interval scale. A scale of (1 – 15) should be adequate.

	Ordinal rank	Interval rank (1 – 15)
(a) transmission (somewhat important)	3 rd	6
(b) new tires (most desirable)	4 th	12
(c) muffler (not too valuable)	2 nd	5
(d) engine tune up (most valuable)	4 th	12
(e) wiper blades (least important)	1 st	3

Note two things in this example. First, two or more objectives can tie in how much the agent believes they contribute towards the goal. Second, we did not use the full spread of the interval scale. In effect, the interval scale is (3 – 12). This is fine, so long as the intervals accurately represent the amount of importance the agent believes one objective has for the goal over another – importance that was qualitatively contained in the agent's verbal rating. Now let's normalize to 1.0. Sum $6+12+5+12+3=38$. Divide ($6/38=.15$), ($12/38=.32$), ($5/38=.13$), and

($3/38=.07$). These results sum to 1.0, representing the normalized value of the goal: the agent's car in good condition for the trip. The objectives divide the value of the goal up this way:

- (a) fixed transmission is worth .15 part of the goal's value for this agent,
- (b) a set of new tires is worth .32 part of the goal for this agent,
- (c) replaced muffler is .13 part of the goal for this agent,
- (d) engine tune up is .32 part of the goal for this agent, and
- (e) wiper blades are .07 part of the goal for this agent.

Example #3: As a final example of ranking objectives, suppose that you have graduated college, have landed a nice job in a nearby city and must now find a place to live. Your goal is to find the best apartment to rent for yourself. Your objectives serve to define exactly what "best" means for you in this case. Let's say these are: (a) an affordable apartment, (b) a clean building, (c) a quiet apartment, (d) it should have a good location relative to your place of work, your social life, and the school where you plan to take a few evening graduate courses, and finally (e) it must be in a safe neighborhood. Achieving these objectives, you believe, will get you your goal. But how important to you are these objectives compared to each other? At your new job you do not start out making a lot, so let's suppose that affordability is clearly your primary concern. Cleanliness is least important, you are thinking, because you can always do some cleaning yourself if need be. The noise level is fairly important, say in the middle, for at night you tend to be a light sleeper. Location is pretty high on your list because you do not like big commutes to work, family and friends, or school, especially in winter. But safety is even more central to your goal than location, for if you don't feel safe you know you will not sleep well and this will affect both your job and your social life. With these beliefs and desires, a goal analysis yields the following normalized objective ranking.

Objectives	Qualitative rank	Ordinal rank	Interval (1 – 10)	Normalized
(a) affordable	highest	5 th	10	.37
(b) clean	lowest	1 st	1	.04
(c) quiet	so-so	2 nd	3	.12

(d) location	important	3 rd	5	.18
(e) safe	next highest	4 th	<u>8</u>	<u>.29</u>
			27	1.0

This last example of finding a good apartment contains an important point about objectives, one that could easily be the source of confusion and which we “cautioned” about earlier. There is a natural tendency to try to understand new ideas in terms of things we are already familiar with. The concept of objectives (that is, parts of a goal) is probably a new idea for you, while a “to do” list is probably something you are quite familiar with. You might feel it natural to think of a list of objectives as a “to do” list. Let’s say that you are going to have a party, your goal is to throw a really good party, so you make a “to do” list of all the things you need to buy and to get done in preparation for the party. You list: buy wine and beer, send out invitations, borrow CD’s for music, make snacks, ..., etc. Note, however, that such a “to do” list could be completely done and yet not a single part of your goal achieved; you may complete all the preparations for a party and yet the party might not take place at all. This means that none of the entries on such a “to do” list count as objectives (none are actual parts of throwing a good party).

The list of objectives for each of the first two examples above (having a nice yard for family and friends to enjoy and having a car in good condition for a long road trip) might each seem like nothing but a “to do” list. However, it would be a mistake to think of a list of objectives as a “to do” list, a list of preliminary preparation activities or plans. Look at example #3 above; clearly things like safety, affordability, and convenient location are not part of a “to do” list, these are not things the agent in the example can “do.” Also, to achieve a goal an agent might well have a “to do” list (and typically will) whose items are not objectives. In connection with a specific apartment’s safe neighborhood or exact location, for example, our imaginary agent might have a “to do” list that contains things like: call local police station for crime estimates, get transportation tokens, fill car with gas, call Harry to meet me at the apartment, ..., etc. Such “to do’s” are clearly not parts of the goal of a good apartment, even though they might be activities the agent needs to do in preparation of examining potential candidates.

It is important, then, not to confuse a list of objectives with a preliminary preparation “to do” list. Parts (objectives) of a whole (goal) are not the same thing as a list of activities a particular agent has to do in order to be able to do something else. A “to do” list is, typically, a way to carry out a decision already made; getting clear about a complex goal's objectives is reasoning toward making a decision. Let's repeat the test. Ask: for each entry in the list of objectives, will achieving each one gain a part of the goal? If yes, then the list contains only objectives. But if for one entry the answer is no, then that entry is likely a preliminary preparation step and not an objective: remove it from the list!

With this clarification in mind, we are ready to turn to the next chapter and the topics of how to form a menu of options and how to form criteria by which to evaluate which has the best outcomes toward achieving the goal. Here is a brief summary of the concepts and methods covered in this chapter on which the next chapter's material will build.

2.5 Summary

Practical reasoning can't begin without a goal. Given a goal, it is clarified in two steps.

Step #1: Goal identification. Make it clear:

- (1) who the stakeholders of the decision are
- (2) what in the total consequences will count as outcome
- (3) whether the goal has intrinsic value or relative value for the agent.

Step #2: Goal analysis:

- (1) list the goal's objectives (satisfying 4 conditions)
- (2) qualitatively rank objectives
- (3) rank objectives on an ordinal scale (preserve the qualitative order)
- (4) rank objectives on an interval scale (preserve the qualitative degree of importance)
- (5) normalize the interval ranking

EXERCISE: Goal identification and analysis.

- (1) Make up three goals.
- (2) For each of these three goals, identify it by describing it in a statement that makes it clear:
 - a) who the stakeholders are
 - b) what part of the total consequences of an action an agent might do counts as outcome and what part counts as non-outcome consequences
 - c) whether the goal has relative value or intrinsic value for the agent.
- (3) Analyze each goal into at least four objectives
 - a) first by using qualitative words that rate the relative importance of each for the goal
 - b) next by ranking on an ordinal scale
 - c) next by ranking on an interval scale
 - d) finally by normalizing to 1.0.

For the purposes of this exercise, the objectives do not have to meet conditions 1 or 2 in section 2.4.1 (above). A list of at least four objectives will count as sufficient for practice. But note that condition 3 must be satisfied, or else the quantitative information will not add up.

Here are some suggestions to think about. You can think of yourself as one person, or as a club, or as a family, or as a business, or as a nation, a school system, a sports team, or any other kind of individual agent. This gives you a wide range of possible goals to dream up. For your three goals, try to vary among these possible agents. As a person, your goal might be getting into a good college, buying an item like a computer or a car or even illegal drugs, visiting a city/country for vacation, or quitting smoking. Come up with possibilities that you have some experience about – personally or from material you have learned about in other courses. As a family, your goal might be to remodel a room in your house, visit a theme park, buy a house, or

even steal valuables from the nearby town recycling center. Again, think about experiences you have had as a member of your own family. As a nation, your goal might be to overthrow the government of a rival country, develop a national airport security system, a national health system, rebuild a major coast-to-coast highway, or establish a trade agreement with another nation. The same thing for the case of a club, a sports team, a school, a business, etc. – use your experience and your education to form natural and typical goals for the kind of agent you imagine yourself to be. For this exercise, feel free to put aside the assumption made at the beginning of this chapter that goals are only things that are morally, legally, and socially permissible. The goals you come up with need not be anything good or conventional, as some of my examples might have suggested to you; you are free to make them strange or illegal. You could be a group of thieves whose goal is to rob a bank, for example (although I hope you will not have personal experience to draw upon in such cases!).

Sources and Suggested Readings:

The generous (but not loose!) concept of goal used in this chapter, and throughout this text, is inspired by several articles of Amartya Sen. For a powerful argument against too narrow a conception of goals in practical reasoning, Chapter 5 “Goals, Commitment, and Identity” in Sen (2002) is well worth the effort. For a more broadly philosophical reflection on the importance of an expansive concept of goals in the study of rational choice, see the second half of Lecture 3 in Sen (1987). The techniques of goal identification and analysis presented in this chapter draws from Keeney (1992) Chapters 2 and 3, Keeney and Raiffa (1993) Chapter 2, and Mullen and Roth (2002) Chapter 3. Keeney (1992) is especially accessible, but be alert to differences in

terminology: our term “goal” is his “fundamental objective,” and our term “objective” is his “strategic objective” and “means objective.” Our terminology is more in keeping with Keeney and Raiffa, and the presentation in Mullen and Roth. The classic discussion of the central importance of goals (ends) in human reasoning and activity is in the early sections of Book 1 of Aristotle’s *N. Ethics*. Dewey’s position on the value inseparability of means-ends in moral and practical reasoning offers an interesting pragmatist perspective; a nice introduction to Dewey’s views on this issue can be found online in the Stanford University Encyclopedia of Philosophy (<http://plato.stanford.edu/entries/dewey-moral/#3>). The entry for “value: intrinsic vs extrinsic” in this encyclopedia is also recommended. Given the importance in practical reasoning of methods for representing information by scales, Appendix A in Mullen and Roth, and Chapter 2 in Rapoport (1966) are highly recommended.