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Conceptualizing and Measuring Trust and Trustworthiness

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Conceptualizing and Measuring Trust and Trustworthiness*

Paul C. Bauer

June 2014

Abstract

This study investigates the concepts of trust and trustworthiness. The vagueness in which both concepts are defined, measured and related to other concepts in the social sciences impedes the accumulation of scientific knowledge. Building on previous definitions and research, a general conception for both concepts is derived. This conception may serve as a starting point for future research as well as a basis to analyze research done so far. It is flexible enough to describe a wide variety of empirical cases in which both concepts are at stake and sets a clear boundary between the concepts themselves and their causes. Besides, it helps to discern trust and trustworthiness from other closely linked concepts and to systematize different other trust concepts. Finally, departing from this conception measures of trust and trustworthiness are criticized and potential improvements suggested.

Keywords: trust, trustworthiness, social trust, generalized trust, political trust, trust propensity, trust radius

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1 Introduction

Research on the two popular concepts *trust* and *trustworthiness* suffers from three problems and resulting negative effects. First, there are a vast number of definitions and many are elusive and ambiguous, a situation many scholars lament (Bigley and Pearce 1998; Hardin 2006; Hoffman 2002; Hosmer 1995; Lewicki and Bunker 1995; Luhmann 1988; McKnight and Chervany 1996; Nannestad 2008; Shapiro 1987). This condition makes it very difficult to structure and compare research that has been made so far.¹ As a result of conceptual vagueness, theories connecting these concepts to other phenomena are often vague and blurred. Especially in the case of trust, various scholars have coined different trust concepts such as “particularized trust”, which further adds to the confusion. As a result debates that evolve around these concepts often seem at cross-purposes. A recent example is a debate on the forms of political trust. This debate hinges on a conceptual misunderstanding since Fisher, van Heerde-Hudson and Tucker (2011) (see also Fisher, van Heerde and Tucker 2010) differentiate forms of trust according to the considerations the expectation is based on (e.g. strategic considerations). Hooghe (2011), in contrast, differentiates forms of trust according to the trustee at which the expectation is directed (e.g. a parliament or a government). Various other examples are discussed in chapter 3 in Hardin (2002). Second, definitions of trust and trustworthiness are often followed by completely detached empirical measurement, hence, there is a lack of concept-measurement consistency (Goertz 2006: 95). As a consequence empirical tests of the theoretical arguments used to relate trust and trustworthiness with other phenomena are often debatable, since they do not really test those arguments but rather relationships between measures of something else. Third, the clear difference between trust and trustworthiness is often blurred (Hardin 2002) both in discussions of the concepts themselves and in theories as well as empirical investigations, linking these concepts to other phenomena. In contrast to trust, the concept of trustworthiness has received far less attention, although it is the essential “twin” of the concept of trust.

Altogether, the fact that scholars do not depart from a common conception of trust and trustworthiness has the above described effects and impedes an accumulation of knowledge. Therefore, the present study seeks an answer to the general question: *How should we define (i.e. what are) and how can we measure the concepts of trust and trustworthiness?* In pursuing this question I contribute to existing research in the following ways: First, building on rich previous conceptual work I systematically analyze a wide variety of definitions and derive a conception for trust and its “twin” trustworthiness. This conception should lead to clearer theories and help to avoid inconsistencies such as confusing expectations with behavior (Sec. 2). Second, I discuss how this definition can be easily adapted to comprise clear amounts of real-life cases. This adaption process forces us to think clearly about the trust situations we investigate and helps to make an informed choice of the cases we scrutinize (Sec. 3). Third, I suggest a basic way of classifying causes of trust and trustworthiness that could hopefully improve theory (Sec. 4). Fourth, departing from the conception I point to common problems in current research, clarify differences and similarities

¹See Bromiley and Cummings (1995); Hosmer (1995); Lewicki and Bunker (1995); McKnight and Chervany (1996); Mishra (1996); Sitkin and Roth (1993) for noteworthy attempts to typologize research on trust.

between trust/trustworthiness and other concepts and shortly discuss the meaning of other trust concepts such as particularized trust (Sec. 5 and 6). Fifth, I summarize current ways of measuring trust, discuss related problems and suggest potential solutions (Sec. 7).

2 Deriving a definition of trust and trustworthiness

Several notions reappear across a broad number of definitions of trust and trustworthiness that were coined by different authors. These are discussed below and taken as a starting point to derive the conception defended in this study.

First, several notable scholars agree on the fact that trust and trustworthiness play a role in situations that can be described referring to *three elements* (Baier 1986, Hardin 1992: 154, Hardin 2002, Luhmann 1979: 27, Sztompka 1999: 55). For instance, Baier (1986) points to the importance of differentiating between different trustees and the expected behavior in this relation, thus, “taking trust to be a three-place predicate (A trusts B with valued thing C)” (Baier 1986: 236). Slightly reformulated, when speaking about trust we essentially speak about a truster A_i that trusts (judges the trustworthiness of) the trustee B_j with regard to some behavior X .² Turning this statement around we may speak of a trustee B_j who is trustworthy with regard to some behavior X and a truster A_i . These three parameters suffice to define the concepts of trust and trustworthiness. In addition, as argued in Section 3, they are subtle in that they may be replaced with different real-life trustees and behaviors. Moreover, this formulation illustrates that a differentiation between trust and trustworthiness is of fundamental importance. Even “when there is no call for trust, a person or institution can possess the attributes of trustworthiness” (Levi and Stoker 2000: 476), i.e. a trustee can be trustworthy independently from whatever level of trust the truster has in him. Certainly, one could add further parameters such as context S - e.g. a certain neighborhood - however, that would unnecessarily increase the complexity of an otherwise parsimonious statement. Rather additional parameters should be seen as causal factors that explain both trust and trustworthiness and, thus, do not belong to the concepts themselves (see Sec. 4). In this regard, abstraction and simplification from complex reality is regarded as a necessity in deriving a useful conception.

Second, both concepts can be conceived of as *probabilities*. The idea of *trust as a subjective probability*, as a degree of belief, seems fairly clear (cp. Hoffman 2002: 379). Several authors directly refer to “probability” in their definitions. For instance, Gambetta (1988: 217) asserts that trust “is a particular level of the subjective probability with which an agent assesses [...] another agent”. Similarly, Offe (1999: 47) writes that trust is a belief that “refers to probabilities that [...] others will do certain things or refrain from doing certain things”. Dasgupta (1988: 62, 65-66) uses

²The term behavior also encompasses passive behavior or non-behavior such as refraining from robbing someone, stealing a bike etc. (e.g. Offe 1999: 47). Instead of simply using the term “behavior”, Sztompka (1999: 55) uses the term content, but X has also been called the domain by Levi and Stoker (2000: 476). Below, the synonymous expressions “behave trustworthily” and “be trustworthy” are used interchangeably. The same is true for “expectation” and “judgment”.

the example of a customer who is unsure whether a salesman is trustworthy or untrustworthy and “imputes a (subjective) probability p to the salesman being honest”. Coleman (1990: 99) does not explicitly define trust as a subjective probability, however, he develops a formal model for the “placement of trust” in which the mentioned subjective probability appears as an expectation. The above definitions are widely cited by other scholars in the field who also seem to have embraced the idea of trust as a probability, a probability that quantifies a subjective belief that a trustee will behave trustworthily. The idea of trust as a subjective probability has also been criticized (e.g. Nooteboom 2002: 39-41). First, if the subjective probability is 1, no risk is left which seems to be an essential characteristic of the concept of trust. However, even when a person reports that he trusts someone 100%, it is an expectation regarding a future event. Independently from this expectation there is always the objective risk that this expectation might be wrong. Second, the idea of subjective probability might seem too rational and calculative to describe expectations by humans (Nooteboom 2002: 41, 42). Importantly, by defining and measuring trust as subjective probability we do not make any assertions regarding rationality. Just on the contrary, individuals’ judgments may be wrong and also systematically biased (see Sec. 4). Besides, if we assume that a scale from 0 to 100 is too fine-grained we can always use a scale with fewer scale points. Importantly, respondents do not seem to have problems in expressing simple expectations in probabilistic terms (see Sec. 7).

The idea of *trustworthiness as a probability* is not directly stated in the literature. Rather, different scholars discuss attributes or factors that may raise trustworthiness, i.e. the probability that one lives up to the truster’s expectations. According to Mayer, Davis and Schoorman (1995: 716-717) the most important and constantly reappearing characteristics are ability, benevolence and integrity. Likewise, Levi and Stoker (2000: 476) define trustworthiness referring to attributes a trustee B_j might possess: “a commitment to act in the interests of the truster because of moral values [...], caring about the truster, incentive compatibility, or some combination of all three” and second, “competence in the domain over which trust is being given” (see McKnight and Chervany 1996: 34-35, Hardin 2002: 28-29 and Bacharach and Gambetta 2001: 153 for similar arguments). Rotter and Stein (1971: 335) seem to refer directly to a probability notion of trustworthiness: “[T]rust and trustworthiness are closely related. The less trusting an individual, the more *he is likely* to lie or to deceive others”, i.e. to behave untrustworthily. Hence, although the idea of trustworthiness as a probability is often not explicitly stated it seems to be implicit behind many elaborations, namely in that the different attributes of trustworthiness may raise the objective probability that an actor behaves trustworthily.

Third, there is also a *temporal dimension* to the concepts. When we speak about trust, it is a generally accepted characteristic of the concept that it refers to expectations about future behavior. Many authors have defined trust in this way, even if their definitions differ in many other respects (see, e.g. Bacharach and Gambetta 2001: 150, Baier 1986: 235, Barber 1983: 8-9, Dasgupta 1988, Gambetta 1988: 217, Hoffman 2002: 378, Luhmann 1988: 97, Mayer, Davis and Schoorman 1995: 712, Offe 1999: 47, Sztompka 1999: 25). Similarly, most scholars do not directly define trustworthi-

ness but discuss factors that should impact the future behavior of someone such as the willingness and ability to behave in a certain way (McKnight and Chervany 1996: 34). Hence, normally trust describes (potentially wrong) expectations about a trustee’s future behavior whereas trustworthiness describes the real probability of this future behavior. Nonetheless, in our theories we should clearly specify whether we talk about prospective or retrospective trust judgments. Prospective trust judgments are normally to some extent based on retrospective trust judgments that, in turn, should depend on experiences with others’ trustworthiness in the past. We can measure prospective and retrospective trust judgments empirically, however, trustworthiness can only be measured after the trustee has shown some (un-)trustworthy behavior (although we may try to predict his future trustworthiness).

Fourth, trust and trustworthiness are generally linked to behavior that has a positive value for the truster (e.g. neighbor returning borrowed money; friend keeping a secret; car not breaking down). In other words, trust and trustworthiness rest on the premise that A_i has a preference with regard to behavior X . A_i prefers that B_j displays trustworthy behavior X_T rather than untrustworthy behavior X_{-T} . By adding this assumption trust/trustworthiness are set apart from simple expectations/behaviors. This idea is reflected in many accounts of trust and trustworthiness. Mostly, because authors refer to the fact that trust and trustworthiness are related to the interest of the truster (e.g. Hardin 2002; Levi and Stoker 2000; McKnight and Chervany 1996). Others do so more implicitly in that they restrict the behavior of the respective relationships to behavior that should normally be against the interest of the truster. For instance, Rotter and Stein (1971) refer to lying or deceiving others. I avoid the term interest since it is the subjective nature of preferences that matters in trust situations. A trustee could act in our objective interest (lie to us for our own good) but we would still feel betrayed if he acts against our subjective preference. Finally, it can be assumed that preferences are often similar across A_i s.³

Fifth, *trust and trustworthiness are at stake in all sorts of cases* and scholars of various disciplines differ in the restrictiveness with regard to the trusters (As), trustees (Bs) and behaviors (Xs) they investigate in their research. Researchers investigate trust judgments by individuals in general, but also more specific groups such as patients (Mechanic and Schlesinger 1996), criminals (Gambetta 2006) and taxi drivers (Gambetta and Hamill 2005). Similarly, trustees in empirical research encompass others in general but also more specific trustees such as the police or courts (Tyler and Huo 2002), political parties (Carlin 2014), partisans (Carlin and Love 2013), science and technology (Roberts et al. 2011), sellers (Doney and Cannon 1997) and investments (Bottazzi, Da Rin and Hellmann 2011) just to name a few. Finally, researchers name a wide variety of behaviors such as truth-telling (Rotter 1967) regarding which trustees are assessed. An applicable and general conception should be flexible enough to encompass a wide variety of behaviors as well as non-human trustees. This can be achieved by *keeping the abstract placeholders ABX in our conception* and replacing them with specific content depending on our research question. For the social sciences

³Is it important that the trustee is aware of the truster’s preference? In my view it is not important and it would force us not to use the concepts when discussing trust in and trustworthiness of objects.

we can generally agree that A should encompass single individuals or groups of individuals. B, in turn, should be a placeholder that can be filled with different content, certainly single individuals and groups of individuals (e.g. a government), but also with physical objects (e.g. a dice, a car, a plane) or institutions (e.g. a certain law, democracy as a set of institutions, the legal system).⁴ X, in turn, may refer to behavior of different sort, such as “does not steal my bike”, “protects the human rights” and “won’t crash”. This flexibility is useful as long as researchers clearly state the substance of the elements ABX, that is the cases they investigate.

To sum up, cases of trust and trustworthiness can be described by *three elements* (A_i = truster; B_j = trustee; X = behavior) and concern *behavior* to which a *preference by the truster* A_i is attached. Both concepts designate *probabilities*: Trust the truster’s subjective probability, i.e. expectation, trustworthiness the trustee’s objective probability of displaying trustworthy behavior. Further specification of whether we theorize about past, present or future trust/trustworthiness is helpful. Besides, a useful conception should be flexible enough as to encompass all sorts of cases, i.e. have a *broad extension*. These characteristics may be used to derive a unified definition:

Trust P_{A_i} is A_i ’s subjective estimation of the **trustworthiness** P_{B_j} of B_j . P_{B_j} is the objective probability that B_j displays behavior X_T preferred by A_i rather than X_{-T} .

Both P_{A_i} and P_{B_j} potentially depend on all three elements of the relation (ABX) and, as probabilities, P_{A_i} and P_{B_j} may take on values from 0 to 1. Moreover, P_{A_i} is not necessarily related to P_{B_j} since A_i may over- or underestimate B_j ’s trustworthiness. Besides, trust is an attribute of truster A_i whereas trustworthiness is an attribute of trustee B_j . I use P_{A_i} to designate a single truster’s trust and P_A for several trusters. Analog, P_{B_j} designates a single trustee’s trustworthiness and P_B the trustworthiness of more than one trustee.

3 From abstract conception to concrete situations: How to choose cases of trust and trustworthiness

We have to restrict ourselves to certain cases when we investigate levels of trust and trustworthiness and when we search for causes or consequences of these phenomena. Naturally, we choose a subset of all possible cases by specifying ABX and choosing categories that are more or less expansive, in other words that encompass the universe of all possible As, Bs, Xs or just a small subset of them.

More importantly, this choice comes with a trade-off. On the one hand we may be interested in the very specific case of two persons. For instance, we may be interested in the case of Peter (= A_{Peter}) who has a certain level of trust in John (= B_{John}) to return 20 euros (= X_T) that he lent him. We could come up with a specific explanation of what affects Peter’s trust (= $P_{A_{Peter}}$) or John’s trustworthiness (= $P_{B_{John}}$) in this specific case. For instance, John might be rich which

⁴In contrast, to Hardin (2002) who clearly excludes “abstract” trustees such as governments, in his “encapsulated interest view” of trust, I suggest trust and trustworthiness should be conceptualized without this restriction.

may result in high levels of trust and trustworthiness. John can easily return the money and Peter knows that. If John was in financial trouble or the amount of money equaled 50000 \$, we would expect $P_{A_{Peter}}$ and $P_{B_{John}}$ to change. Regarding this very specific situation, we may arrive at a very precise estimation of $P_{A_{Peter}}$ and $P_{B_{John}}$, we may easily identify the causes for the respective levels of $P_{A_{Peter}}$ and $P_{B_{John}}$ and may well predict the consequences of low levels of $P_{A_{Peter}}$ and $P_{B_{John}}$, e.g. Peter doesn't give John the money in the first place, and if he does, John will be likely to fail to return it.

As social scientists we are normally interested in finding regularities across a large number of cases. Hence, we will not restrict the universe of cases to the situation in which Peter is thinking whether he should borrow John a certain amount of money. Rather we would try to measure levels of P_A and P_B across a large number of cases i and j and try to find causes and consequences of levels P_A and P_B for a large number of them.

The *choice of A and B* depends on the social system we study. Some researchers are only interested in subsets of the "world". For instance, if a researcher is interested in trust and trustworthiness within companies, then automatically the cases he investigates are reduced, i.e. A and B are restricted to people within companies. Another researcher might be interested in judgments of strangers. Here, A and B encompass many more cases. A could be any individual in a country, B could be any other individual in a country. Clearly there is a *trade-off*: The fewer cases are subsumed under the chosen categories for ABX, the more precise our theories about P_A and P_B .

The *choice of X* depends on the following question: For which X would low trust P_A and low trustworthiness P_B impede cooperative relations, i.e. entail costs for the respective social system and its members? In short, our choice depends on the relevance of the respective expectations and behaviors for the system we study. For instance, when we study companies we may probably come up with behavior such as knowledge-sharing (see [Mooradian, Renzl and Matzler 2006](#)) that we deem absolutely relevant for their well-functioning.⁵ When investigating societies we may come up with many Xs and even have to subsume them under a more general category such as "respecting my property".

To sum up, when studying trust and trustworthiness we should follow the advice of [Barber \(1983: 17\)](#) and "always specify the social relationship or social system of reference", that is we should make explicit who the trusters and trustees are we are interested in, e.g. members of societies, families or companies. This choice already restricts the trusters A and the trustees B we are theorizing about and among which we try to measure trust and trustworthiness. Subsequently, we have to reason which behaviors are relevant in that system.

⁵Another example: Among scientists it is important that one scientist can trust other scientists not to steal his ideas. If P_{A_i} is low, A_i won't share his ideas. Costs arise because other scientists may have given A_i good advice on how to realize this idea. Also several people may work on the same idea without knowing of each other.

4 Specifying causes of trust and trustworthiness

In general, one should not confuse trust and trustworthiness (P_{A_i} and P_{B_j}) with their causes and consequences. In what concerns the causes of trust and trustworthiness among humans, we should differentiate between internal and external factors.

First, trust as an expectation is based on thought processes and emotions (C_{A_i}) that influence A_i 's estimate of the probability of B_j with regard to X_T . These factors C_{A_i} do not belong to the concept of trust itself, but should rather be seen as causal elements that explain variance in probabilities estimated by different trusters. C_{A_i} is related to ABX in that different trusters A potentially rely on different C_{A_i} s that also vary as a function of B_j and X. For instance, when boarding a plane we might trust the pilots not to cause a plane crash because we assume that it is in their self-interest to do so (cp. [Hardin 2002](#)) and they feel responsible for their passengers. When judging the trustworthiness of a family member or a close friend emotions may bias our otherwise more critical judgment (cp. [Hoffman 2002](#); [Michel 2013](#)). Depending on personal attributes some trusters may focus on the moral values that they think B_j possesses, whereas other trusters may consider the potential sanctions that B_j might be subject to. Likewise, some As may rely on more complex thought processes, others might rely on simplistic heuristics (“individuals with long hair can not be trusted”). But we may also find that most trusters rely on similar C_{A_i} s. In the end all individuals come up with an expectation, i.e. a certain level of trust even if the process to arrive at this judgment is a different one. Second, *trustworthiness* is the objective probability that B_j behaves trustworthily and not A_i 's estimation. It is an attribute of B_j , not of A_i . There are, again, thought processes and emotions C_{B_j} that should influence this probability. For instance, B_j may be very trustworthy because he considers the potential punishment through a third party (e.g. the older brother) with regard to a certain X and truster A_i . Or B_j could be a family member of A_i .⁶

Most research centers on the impact of factors F that are external to trusters and trustees. For instance, we could investigate the effect of police density on certain cases and the corresponding probabilities. However, it is essential that in making the theoretical connection between these external factors F and P_A or P_B we should - at least in our theoretical reasoning, but ideally also in our empirical tests - include the thought processes and emotions (C) individuals might have, since these are often triggered by external factors F. For instance, we could argue that a well-functioning law system F will increase the knowledge of and belief in potential punishment. On average this might lead to an increase of P_B for cases for which the law system assures punishment of untrustworthy behavior.

In sum, we should follow a basic distinction between external factors F that influence trust and trustworthiness and the thought processes and emotions (C) that mediate the effects of F on P_A and P_B . By specifying the respective elements in our theories we may arrive at clear arguments how certain external factors (e.g. the law system) raise or reduce P_A and P_B . Again, one has to point

⁶In cases in which B_j is an object such as a car - motivations, thoughts, emotions do not matter, rather we might theorize about certain attributes of this object.

to the trade-off mentioned before: The fewer cases are subsumed under the chosen categories for ABX , the more precise our theories about the connection between P_A , P_B , C and F will probably be. Besides, it is logical that our theories concerning causes and consequences of trust and trustworthiness need somehow to be adapted to the cases that we defined before. For instance, an effective law system is only relevant for certain cases of trust and trustworthiness but not for keeping secrets among friends. Depending on the substance we choose for ABX , the causes and consequences we focus on may differ dramatically.

5 Conceptual clarifications and misunderstandings

The here derived conception can be used to clarify the meaning of other concepts that are often mixed with trust and trustworthiness.

First, the above understanding establishes that trust is an expectation and *not a decision or a behavior*. Hardin (2002: 58-60) regards this position as “trivially evident”, however, researchers often mix expectations and ensuing decisions or behaviors in their theories and definitions. Since trust is an expectation about future behavior it is not necessary that some exchange or action took place. “Trusting behavior” (Barr 2003), e.g. A_i lends 20 euros to B_j , may be a consequence of a certain level of trust, i.e. the subjective probability the truster estimates (e.g. $P_{A_i} > 0.7$). However, sometimes observed alleged “trusting behavior” is due to the absence of other behavioral options, coercion or indifference rather than a high level of trust. Generally, this conceptual clarification highlights that theories about trust are not decision theories such as the “expected utility theory” or the “prospect theory” that take into account various other aspects such as the costs of different choices.

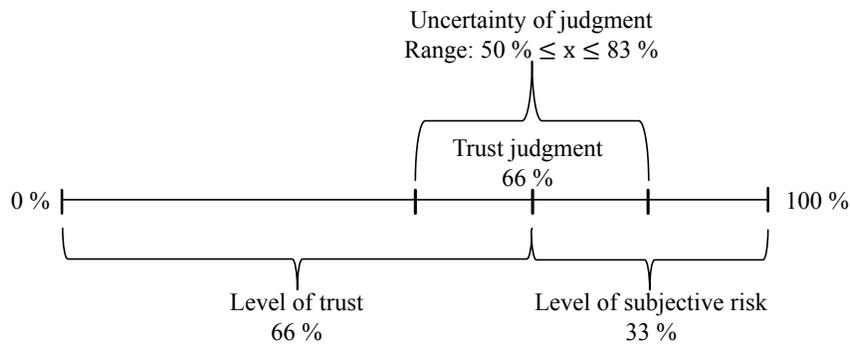
Second, we may treat *trust* and *confidence* as synonyms as many authors are doing already. However, we should probably use the former term since there is some disagreement regarding confidence in the literature. Following Luhmann (1988: 97) and Deutsch (1960: 124) one can sensibly argue that the term confidence represents a narrower understanding of trust, namely the case in which the trust judgment exceeds a certain threshold (e.g. $P_{A_i} \geq 0.8$). Confident individuals are individuals with a high level of trust. Luhmann (1988: 97) writes: “If you do not consider alternatives [...], you are in a situation of confidence”. Deutsch (1960: 124) describes confidence as “the individual’s assumption that the event he desires rather than the event he fears will occur”. Thus, an individual with “low confidence” would still be located somewhere in the upper range of the trust scale (e.g. confidence could range from 0.5 to 1 on the trust scale). To avoid these conceptual pitfalls we could stick to the term trust.

Third, in contrast to Cook, Hardin and Levi (2005: 33f), Hardin (2002: 89f) and Lewicki and Brinsfield (2012) I argue that it doesn’t make sense to treat trust and *mistrust/distrust* as two distinctive concepts. Wrightsman and Wuescher (1974), Lagace and Gassenheimer (1989) argued that mistrust and trust are two distinct constructs. However, constructing multiple scales to measure

both trust and mistrust [Omodei and McLennan \(2000\)](#) find that one “trust scale” underlies these items. Similarly to e.g. [Gambetta \(1988\)](#), [Luhmann \(1980\)](#) and [Carlin \(2014\)](#), I suggest to treat mistrust/distrust as antonym for trust, only that the scale is reversed. For instance, if we ask “How high is the probability that the government will put an end to the economic crisis?”, then the lower an individual’s estimated probability (e.g. $P_{A_i} = 0.3$), the higher his level of mistrust and the lower his level of trust.⁷ If the probability is low we would expect individuals to behave in ways that suspicious, distrustful individuals do. For instance, A_i will not lend B_j any money if he assumes that B_j is unlikely to return the money. Thus, it seems to make sense to measure trust and distrust/mistrust on one single subjective probability scale.

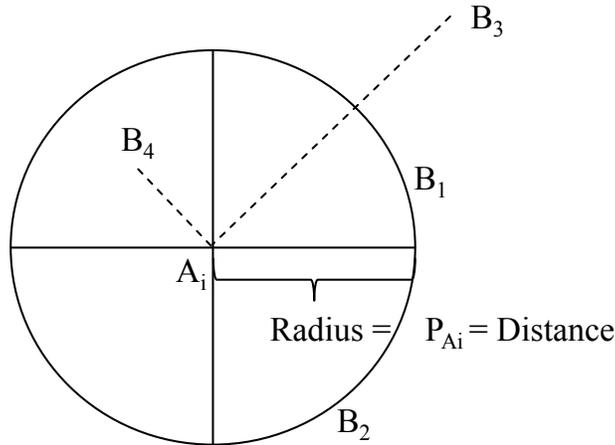
Fourth, *risk* and *uncertainty* can be defined in relation to trust and trustworthiness. First, corresponding to the two concepts there are two types of risk that are simply the complementary probabilities of P_{A_i} and P_{B_j} respectively. $R_{A_i} = 1 - P_{A_i}$ is the subjective risk of the truster A_i . When I have a high level of trust in someone to, e.g. bring me back a purse that I lost, then I estimate the risk that he does not bring back my purse as very low, e.g. $R_{A_i} = 1 - P_{A_i} = 0.1$ (see Figure 1). The same is true for trustworthiness. $R_{B_j} = 1 - P_{B_j}$ is the objective risk complementary to the probability that someone will behave trustworthily. Second, individuals may be uncertain about their judgment of a trustee B_j which can be expressed by an uncertainty interval around the trust point estimate as depicted in Figure 1. In situations in which we don’t have any information about a trustee B_j or in which we don’t have any preconceptions about factors that should influence B_j ’s trustworthiness with regard to X we may find ourselves unable to give any precise estimate. This can be expressed by a big uncertainty interval that covers most of the trust scale going from 0 to 100 (i.e. 0 to 1).

Figure 1: Trust, risk and uncertainty



⁷We could also reformulate this question so that it is the low probability that is preferred by A_i . Then, the higher a truster’s probability estimate, the higher his level of mistrust/distrust.

Figure 2: The radius of trust



Fifth, I define a term more precisely that is constantly reappearing in the literature but generally used rather vaguely, namely *trust radius* (e.g. [Delhey, Newton and Welzel 2011](#), [Freitag and Traunmüller 2009](#), [Fukuyama 2001](#): 8, [Harrison 1985](#): 7-8, [Harriss 2003](#), [Putnam 2000](#): 466, [Realo, Allik and Greenfield 2008](#), [Reeskens 2012](#), [Sztompka 1999](#): 42, [Welch, Sikink and Loveland 2007](#)). Here I define the term departing from our conception. The radius describes the distance between the center of a circle (that would be truster A_i) and the circle line. The plane of the circle encompasses different Bs that display different distances (= radius) with regard to A_i . A certain trust radius simply implies that P_{A_i} is the same for the Bs that are located on the circle line, i.e. that have the same distance to the truster. Hence, a certain distance comes with a certain level of trust. In Figure 2, B_1 and B_2 display the same distance to A_i , so A_i has the same level of trust in them.⁸ In contrast, for B_4 the level of trust is higher, whereas for B_3 the level of trust is lower since the distance is higher. Logically, then researchers have to specify what distance they have in mind since social distance has been conceived in various ways ([Karakayali 2009](#)).

6 Generalized trust and other trust concepts

Figure 3 traces the use of different trust concepts based on data from Jstor ([Burns et al. 2009](#)) and Google Books ([Michel et al. 2011](#)). Since the 1990s the popularity of trust research has dramatically increased.

Generalized trust is described as trust in most people ([Uslaner 2002](#)), i.e. a standard estimate or a “general optimism” regarding others’ trustworthiness ([Glanville and Paxton 2007](#), [Rathbun 2011](#): 248).⁹ The concept of generalized trust is closely linked to the concept of *propensity to trust* or *trait trust* which is regarded as a facet of agreeableness ([Colquitt et al. 2007](#), [McCrae and Costa Jr 2003](#),

⁸Researchers speak of radius, however, the distance represented by the radius is enough to describe different trustees. In other words, we could use a single dimension to depict the problem graphically.

⁹Different scholars defined the concept of generalized trust in different ways (e.g. [Stolle 2002](#); [Whiteley 2000](#); [Bjornskov 2006](#)).

Mooradian, Renzl and Matzler 2006: 527) among personality researchers.¹⁰ This is very close to Coleman’s idea that a person has a “standard estimate of the probability of trustworthiness, p^* , for the average person he [or she] meets” (Coleman 1990: 104).¹¹ Using the here presented formal conception clarifies that generalized trust describes a generalized expectation directed at the general category of humans that is not related to a specific situation with a specific trustee and a specific expected trustworthy behavior X. In other words it is a general individual subjective estimate that others will behave as one expects them to rather than to the contrary. It could be seen as a basic starting level from which specific situational trust judgments deviate in different directions. To this date it is still debated to what extent generalized trust is influenced by experiences (see e.g. Glanville, Andersson and Paxton 2013; Glanville and Paxton 2007; Uslaner 2002 for contrary positions).

Besides generalized trust there are many other conceptual off-springs some of which became very popular. These concepts most often represent special cases of our more formalized conception of trust after specifying the respective As, Bs and Xs. The most frequently used concepts are *social trust* and *interpersonal trust* that are synonyms in that in both cases the trusters as well as the trustees comprise human individuals or groups ($A \& B = \text{humans}$). In most accounts X is not clearly specified, but in more specific accounts such as Rotter (1967), trustworthy behavior is more clearly defined (see Table 1 in appendix). Another widely used concept is *political trust* designating cases in which the trustee belongs to the political sphere ($B = \text{political actors such as a government or a party}$). More specific definitions such as by Hetherington and Husser (2012: 313) restrict the trustee to governments and X to perform well.¹² *Particularized trust* which is often regarded as the “opposite” of generalized trust, is defined as “[p]lacing faith only in our own kind” (Uslaner 2002: 28). Hence, $B = \text{people of your own kind}$, however, it is not really clear who falls into this category. Yamagishi and Yamagishi (1994: 139) also coined *knowledge-based trust* that “is limited to particular objects (people or organizations)” whom one knows. *Thick trust* and *thin trust* categorize different trustees B according to the social distance to the truster (Putnam 2000: 466) (see discussion of trust radius above). Finally, there is the concept of *identity, group or category-based trust* (Brewer 1981; Freitag and Bauer 2013; Kramer 1999; Stolle 2002; Tajfel 1974; Tajfel and Turner 1979). Here, the principal idea is that one might have a higher level of trust towards individuals that belong to a certain category or with whom one shares a common category. Finally, Uslaner (2002) contrasts *moralistic trust* with *strategic trust*. The former is “a general outlook on human nature and mostly does not depend upon personal experiences or upon the assumption that others are trustworthy, as strategic trust does” (Uslaner 2002: 17). The main difference are the different thoughts or emotions C on which these forms of trust are based. Besides, the trustee in moralistic trust are humans in general, but specific persons in the case of strategic trust. According

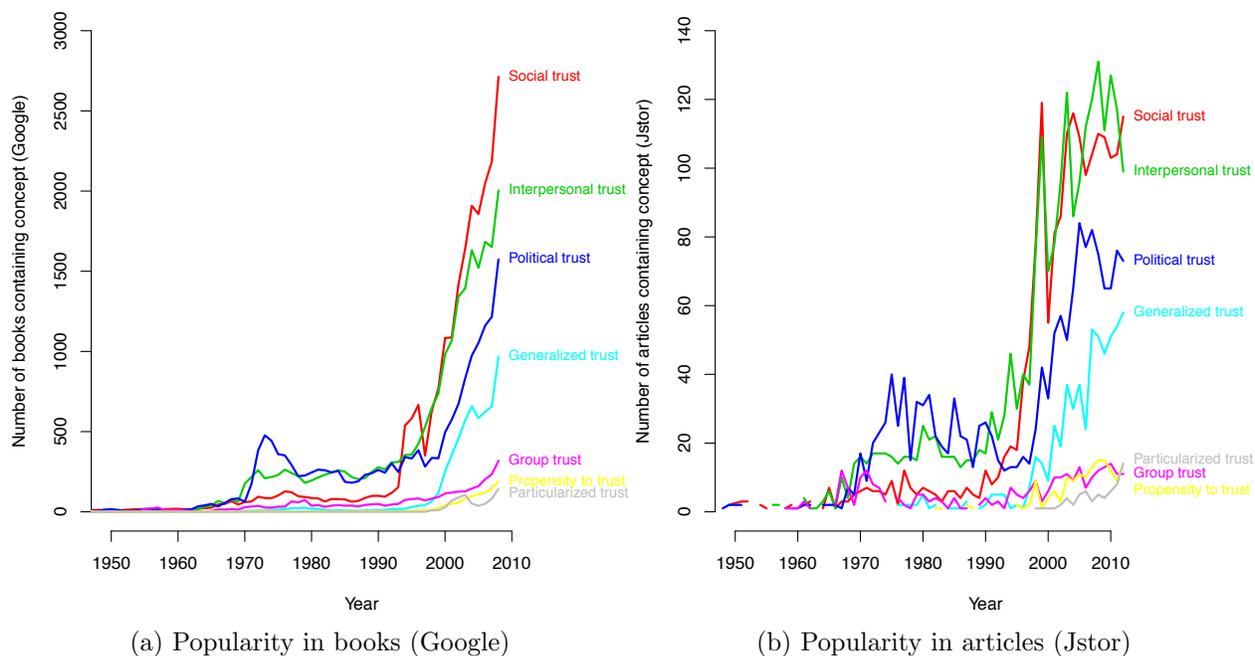
¹⁰Generalized trust, in turn, is similar to *general trust* a belief in the benevolence of human nature (Yamagishi and Yamagishi 1994: 136).

¹¹However, we have to keep in mind that this is not Coleman’s definition of trust that is a behavioral one in essence.

¹²The original definition relates citizens’ performance evaluations to their normative expectations. Operationalization is difficult since it requires measuring both individuals’ normative expectations and their performance evaluations (Seyd 2011).

to Uslaner (2002: 21) moralistic trust constitutes the main source for generalized trust. More trust concepts could be discussed (see Table 1 for further definitions and quick comparisons), but the aim of this section was to show that most trust concepts simply specify one of the elements ABX more restrictively, for instance B as humans in *social trust*. Hence, the corresponding cases can be described systematically departing from our more formal conception of trust.

Figure 3: Popularity of different sub-concepts of trust



7 Measuring trust and trustworthiness

Naturally, the diversity of definitions of trust and trustworthiness did not lead to a common way of measuring the two concepts. Most empirical studies are characterized by a gap between definition and measurement. This concept-measurement inconsistency has also led to a misfit between theories and the empirical data they are tested with. In general, there is a dichotomy between survey research that relies on various survey questions to measure trust (and sometimes trustworthiness) and “experimental” research that relies on observing participants’ behavior in games (mostly played in the lab). These methodological approaches to measurement often set boundaries on the As, Bs and Xs we are able to study. For instance, most research relying on lab games investigates student populations and expectations/behavior regarding monetary exchanges. In our empirical investigations we have to make sure we capture those As, Bs and Xs we are interested in. Below I shortly summarize how trust and trustworthiness are commonly measured in the two fields, discuss related problems and evaluate current measurement in the light of the here presented conception.

7.1 Measurement with behavioral games

Trust has long been investigated by observing participants' behavior in lab games, often by playing the classical trust game coined by [Berg, Dickhaut and McCabe \(1995\)](#) or modified versions.¹³ The general structure of the classical trust game is the following: Truster A_i is given a certain amount of money. A_i then chooses to send all, some, or none of this amount of money to the trustee (recipient) which is called the "amount sent". The "amount sent" is multiplied by some factor and received by trustee B_j . A_i keeps the rest to himself. B_j , the recipient, chooses to send all, some, or none of the received money back to the sender which is called the "the amount returned" (see, e.g. [Ashraf, Bohnet and Piankov 2006: 197](#), [Camerer 2003: 44](#), [Berg, Dickhaut and McCabe 1995](#); [Croson and Buchan 1999](#); [Glaeser et al. 2000](#)). Trust is simply equated and measured with the (average) amount sent across trusters, trustworthiness is equated and measured with the (average) amount returned across trustees. In other words, the more A_i sends the higher is A_i 's trust, the more B_j returns the higher B_j 's trustworthiness. Researchers in this tradition sometimes explicitly mention a definition (cp. [Berg, Dickhaut and McCabe 1995](#)) but mostly simply outline that the classic trust game is played (cp. [Croson and Buchan 1999](#)) or equate trust and trustworthiness with what they are measuring (cp. [Ashraf, Bohnet and Piankov 2006: 197](#)).

[Ermisch and Gambetta \(2006\)](#) and [Ermisch et al. \(2009\)](#) convincingly criticize the classical [Berg, Dickhaut and McCabe \(1995\)](#) version of the trust game. Among other aspects, they point out that the game does not properly reflect trust situations in real-life and that the observed behavior in this game may be due to different motivations such as gift-giving. Finally, the game in its classical version does not allow for testing factors, e.g. sanctions, that might be the most important ones in real life ([Ermisch and Gambetta 2006: 12-13](#)).¹⁴ [Ermisch and Gambetta \(2006: 11\)](#) conclude that "to call the standard form of TGE a trust game is a misnomer" and, suggest a game with modified rules that reflect their criticism. I would like to add some more general points. First, the meaning of trust and trustworthiness changes with the rules of a game. For instance, [Glaeser et al. \(2000\)](#) double the "amount sent" instead of tripling it as in the classic game by [Berg, Dickhaut and McCabe \(1995\)](#).¹⁵ [Fehr et al. \(2002\)](#) use a very different game to measure trusting behavior. [Ermisch et al. \(2009\)](#) again suggest a game with different rules. As long as researchers do not agree on a common design (e.g. binary vs. non-binary behavior by the trustee, specific multiplier of

¹³See [Camerer \(2003\)](#) for a review of lab game research up to 2003; See [Glaeser et al. \(2000\)](#); [Bellemare and Kroeger \(2007\)](#) for applications, i.e. modifications of the classic game. Participants in these games were found to display "irrationally" high amounts of trust and trustworthiness which challenges the behavioral foundations of micro-economic theory ([Ermisch and Gambetta 2006: 3](#)). See [Johnson and Mislin \(2011\)](#) for a meta-analysis of data based on the game suggested by [Berg, Dickhaut and McCabe \(1995\)](#).

¹⁴Different studies try to test factors such as control or sanctioning ability with modified lab games. See for instance, [Buskens, Raub and van der Veer \(2010\)](#) and [Miltenburg, Buskens and Raub \(2012\)](#).

¹⁵Trust and trustworthiness (P_A and P_B) should vary depending on the behavior (X) that is expected of the trustee. As shown by [Johnson and Mislin \(2011\)](#) trust as measured with lab games varies with the amount of money that is at stake. Specifically, [Johnson and Mislin \(2011\)](#) show that trustworthiness - the amount returned - is impacted by the amount by which the experimenter multiplies the amount sent. Naturally, monetary returns are seldom varied in experiments (e.g. [Ermisch et al. 2009: 751](#)), however, departing from our conception I would expect different levels of trust and trustworthiness depending on X . For instance, it should make a difference whether participants play with 20 or rather 200 euros.

money sent) that measures trust, it will be difficult to compare results from different studies. This, in turn, hampers the accumulation of knowledge. Second, (lab) games are restrictive from another point of view. The cases investigated in these lab games only represent a small number of ABX_∞ with A and B most often restricted to specific populations such as students and X restricted to monetary exchanges. One challenge - external validity - pertains to the fact that the As and Bs whose trust/trustworthiness we measure in these games might not be representative of our target population such as a country's population or humans in general (see [Henrich et al. 2010](#) for an overview). The second challenge is that the X measured in the lab is about sending/returning money. Hence, it is not sure whether a person's trusting behavior/trustworthiness as measured in the game is correlated with a person's trusting behavior/trustworthiness with regard to other X i.e. other real life trust situations. If we are interested in behavior in other trust situations it is necessary to play these games with other goods or to show that lab game behavior correlates with trusting behavior in real-life measured through surveys (see [Glaeser et al. 2000](#)).

In how far can we relate the here defended conception of trust and trustworthiness to measurement with (lab) games? First, following our conception I argue that they measure *trust* indirectly since they measure behavior that may result from a certain level of trust (expectations!). This distinction is obvious if one uses the terms "trusting behavior" ([Barr 2003](#)) or "behaviorally exhibited trust" ([Fehr et al. 2002](#)). [Ermisch and Gambetta \(2006\)](#) illustrates how challenging it is to design a game (and rules) that assures that the observed behavior is not due to motives such as "gift giving". Following our conception I suggest to measure trust in lab games simply by querying participants' P_A before letting them act in the experiment that is measuring their subjective probability that B_j will behave as they prefer in the trust game. In the classical trust game one can query expectations regarding the size of the "amount returned". [Fehr et al. \(2002: 532\)](#) measure such an expectation in their study and find that this expectation predicts behavior (see Table 4 in their article). More in line with our conception is to measure the expectation that the trustee will behave trustworthily in the binary trust game that was suggested by [Ermisch and Gambetta \(2006\)](#). In fact, [Ermisch et al. \(2009: 751\)](#) mention the "expectation that the trustee will do X, framed in terms of a probability" ([Ermisch et al. 2009: 751](#)) as one component that goes into the decision to trust, i.e. into trusting behavior. They find that a "person's expectation of the chances of return is strongly related to their experimental trust decision" (see also [Ermisch and Gambetta 2010: 370](#)). This result seems to underline the value of using specific and precise survey questions to measure trust.

As *trustworthiness* was defined as the probability of trustworthy behavior, we do directly measure it in (lab) games when we rely on the binary trust game. But, as emphasized earlier, we only measure very specific trustworthy behavior, namely returning certain amounts of money, which is the behavior investigated in these games. In general, participants of experiments should be asked after experiments what their motivations and the reasoning behind their decisions in the lab game were. This helps to discern whether players play for competition or for fun, in other words it reveals if they have behaved as they would in real life.

7.2 Measurement with surveys

Trust has a long history of measurement in surveys with items tapping trust in different categories such as individuals, governments and so on. Rotter (1967) who investigated interpersonal trust can be regarded as one of the pioneers and is considered to be one of the first to develop a set of questions. Rotter (1967) departed from a clear definition and then proposed multiple items that in combination should be used to measure interpersonal trust. Today, studies in sociology and political science largely focus on the concept of generalized trust and are largely based on a single survey item (with slight variations): “[G]enerally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people?”¹⁶ In the classical version respondents could indicate their answer on a 2-point scale answering “most people can be trusted” vs. “you can’t be too careful in dealing with people”. Nowadays, answer scales with more categories are used which allow respondents to give more subtle answers.

Another important concept, *political trust*, has been investigated relying on a different set of questions. Stokes (1962) who was interested in tapping basic evaluative orientations towards government, was the first to introduce survey questions measuring political trust known as the NES trust-in-government questions (Levi and Stoker 2000: 476-477). Citrin and Muste (1999) give an overview of questions used. All in all, political trust items are similar to items measuring generalized trust. Also *trustworthiness* has been measured in surveys. There is a long history of survey measurement (self-reports) of delinquency and crime as reviewed by Thornberry and Krohn (2000). Other studies have measured trustworthiness rather indirectly by measuring attributes that should influence trustworthiness. For instance, Marien and Hooghe (2011) investigate the relationship between political trust and legal permissiveness and rely on the European Social Survey 1999 that queries to what extent behaviors such as “cheating on tax”, “joyriding” or “accepting a bribe” can be justified. Another example is Bicchieri, Xiao and Muldoon (2011: 174) who measure a norm of reciprocity (also a norm of trusting) querying participants’ expectations about which behaviors, in the context of a trust game, bring about punishment by others.

Measurement of *trust* in surveys is problematic for the following reasons: First, all too often survey questions on trust do not seem to result from a clear conception. Most questions fail to acknowledge that the concept requires the specification of three elements - a truster, a trustee and some behavior of the trustee. If we do not specify a behavior X, respondents may automatically fill in different specifications with regard to X while answering the question.¹⁷ Hardin (2002: 9) early on pointed out that the expression “A trusts B” is elliptical, however, it seems as if this idea only slowly spreads among the scholarly community. A recent study illustrates this problem. Hetherington and Husser (2012) argue that people evaluate governmental trustworthiness considering different issues, depending on the salience of these issues. I assume that these results stem from the fact that no X is specified in the classical political trust questions. Querying respondents’ trust in government

¹⁶Evidence, on whether this question predicts trusting behavior in experiments is mixed (Capra, Lanier and Meer 2008; Ermisch et al. 2009; Glaeser et al. 2000; Fehr et al. 2002).

¹⁷While querying respondents’ trust during a survey in Germany, I was confronted with a counter question: “Trust? With regard to what?”.

with regard to a specific X, e.g. “will successfully defend the country against terrorist attacks”, should solve this problem. Second, besides forgetting the X many trust questions are too vague regarding the trustee B.¹⁸ For instance, the “most people question” is criticized because the category “most people” invites respondents to fill in their own individually varying specifications (Miller and Mitamura 2003; Sturgis and Smith 2010). Hence, interpersonal comparability may be impaired and we may get different values, not because of true differences in trust levels, but rather because of differences in respondents’ question interpretation. As a consequence, scholars have been trying to find out what is measured by the classic standard questions (Dekker 2011; Delhey, Newton and Welzel 2011; Sturgis and Smith 2010).

These problems also matter for survey measures of *trustworthiness* which face one big additional challenge - social desirability. Self-reports are indirect measures in that we do not observe (un-)trustworthy behavior directly but rely on respondents’ indications thereof. At the same time untrustworthy behavior is sanctioned in our societies. Hence, there may be measurement error due to the fact that respondents don’t want to reveal their true behavior. Ermisch and Gambetta (2011: 3) suggest that the survey trust literature is “inevitably silent on trustworthiness” for this reason.

How would we ideally measure trust and trustworthiness departing from our conception and how could we remedy some of the problems mentioned above? After having fixed the cases theoretically we are interested in by defining trust/trustworthiness and specifying ABX we can formulate questions to measure both concepts.

First, following our conception we have to clearly indicate to respondents who the trustees B are when we query trust and who the trusters A are when we query trustworthiness. Moreover, we need to specify some behavior X in both cases. To this date trust questions mostly refrain from specifying a behavior X (see examples above). Trustworthiness questions (e.g. delinquency questions) mostly refrain from explicitly specifying a trustee. Proceeding in this way will maximize the fit between our empirical measures and our definition.

Second, when we define *trust* as a subjective probability we should query a probability from respondents ideally through a probability scale going from 0 to 1 or a percent chance scale going from 0% to 100%. This idea is in line with recommendations by Tourangeau, Rips and Rasinski (2000: 47f, 61) to use scales with absolute quantifiers. Clinton and Manski (2002: 2) argue that respondents seem to have little difficulty using probabilities to express the likelihood of future events if they are adequately introduced to the “percent chance” scale. Besides, the concepts of “probability” or “percent chance” travel much better than the term trust that has “many and varied meanings” in vernacular application (Hardin 2002: XX) and even more so across languages. Thus, we should ask respondents to indicate with what probability they expect certain trustees B to display the trustworthy behavior X.¹⁹ Respondents may even indicate how certain they are about their judgment, if one allows them to indicate a range of probabilities in which their trust judgment, i.e. their point estimation lies (see Figure 1) (cp. Manski 2004). *Trustworthiness* designates the objective

¹⁸Eventually, this problem also applies to X if we do specify it too vaguely in our questions.

¹⁹It is encouraging that Ermisch and Gambetta (2011: 760) find that a “person’s expectation of the chances of return”, which is a very specific question, “is strongly related to their experimental trust decision”.

probability of behavior X by trustee B. Hence, analog to our trust questions we would confront respondents (the trustees of interest) with situations of trustworthiness by specifying As and Xs and query whether they would or have behaved trustworthily in such a situation (e.g. stolen a stranger’s bike; returned a stranger’s purse; kept a friend’s secret). Subsequently, we can compare the level of trust with the level of trustworthiness in our respondent population.

Third, as mentioned before, measurement of trustworthiness (to a lesser extent trust) is hampered by social desirability. To prevent the respondents from giving biased answers they have to perceive that no one is able to identify them when they give true but potentially undesirable answers. Survey methodologists have long been working on developing techniques to solve the problem of sensitive questions and continue to do so (see [Nederhof 1985](#) for some strategies). Recent research on these methods yields promising results ([Coutts and Jann 2011](#); [Jann, Diekmann and Höglinger 2013](#)). Besides, there is evidence that the problem of reporting sensitive information decreases in online surveys because of greater anonymity ([Joinson 1999](#); [Kreuter, Presser and Tourangeau 2008](#)).

8 Conclusion

The concepts of trust and trustworthiness are studied across many disciplines such as sociology, political science, psychology, economics, computer science, organizational studies and management studies. This study started by identifying three problems that pervade research on trust and trustworthiness. First, there are countless definitions of trust and trustworthiness and many of them are diffuse, resulting in vague theories. Second, there is a misfit between definitions and measurement and as a consequence empirical tests of theories about trust and trustworthiness become futile. Third, the distinction between trust and trustworthiness is all too often blurred in scholarly work. These problems lead to the following research question: *How should we define (i.e. what are) and how can we measure the concepts of trust and trustworthiness?* Building on previous work by different scholars the following conception was derived: *Trust P_{A_i} is A_i ’s subjective estimation of the trustworthiness P_{B_j} of B_j . P_{B_j} is the objective probability that B_j displays behavior X_T preferred by A_i rather than X_{-T} .*

This conception may prove to be a more solid and useful foundation for future research on trust and trustworthiness. To start, it is more formal and less diffuse than many earlier definitions. Due to its abstractness it can be applied to manifold real life cases by specifying the elements A, B and X. It compels us to be clear about what cases we investigate, i.e. who the trusters (As) and trustees (Bs) are and what behaviors (Xs) we deem relevant. Therefore, it also pulls us away from the concept of generalized trust. Despite its usefulness generalized trust invites us to neglect the fact that in real life we generally have some information about the trustee (see e.g. [Todorov 2008](#)) or former experiences from which we learn. These may trump more generalized dispositions. Besides, due to its formality and the requirement to specify A, B, and X, the conception leads to more exact ways of measurement.

The main contribution, however, lies in the clear differentiation between trust and trustworthiness,

that is between a truster's subjective probability and the corresponding true probability of a trustee's behavior. Trust and trustworthiness may not be aligned because trusters over or underestimate the trustworthiness of others. Thus, the distinction invites us to investigate if there is a discrepancy and, if yes, when it is strongest and by which factors it is caused. Example questions are: Is there a difference between the subjective probability and the true probability that a lost wallet gets returned to the owner and, if yes what are the reasons? Is there a difference between the subjective probability and the true probability of getting robbed and if yes what are the reasons? Is there a difference between the subjective probability and the true probability that the plane one wants to take has a plane crash and if yes for what reasons? Is there a difference between the subjective probability and the real probability that a friend might not keep a secret to himself? To investigate these discrepancies we need to collect data on both trust and trustworthiness.

Future research should advance in different directions. First, as argued, a researcher's choice of the respective elements ABX depends on his evaluation of which expectations and corresponding behaviors are central for a system, such as a couple, a family or a society. Right now many theoretical elaborations are vague since they are based on rather elliptical concepts such as generalized trust or political trust that do not specify X. If trust research aims at providing an in-depth understanding of the social realm it needs to be more systematic: Who are the trusters/trustees and which are the expectations/behaviors we investigate? Eventually our investigations into the causes and consequences of trust and trustworthiness as well as our measures of these concepts will improve when we set boundaries regarding the cases we study.

Second, future research should deal with the challenges that we encounter in both measurement traditions. Key challenges for survey researchers lie in developing more precise questions in order to minimize measurement error and increase interpersonal comparability. The fact that more precise questions predict trusting behavior in experiments is encouraging. The "consensus" that trust survey questions are poor predictors of behavior in trust games (Capra, Lanier and Meer 2008) is mistaken. Besides, future studies should try to combine measures of trust with measures of trustworthiness in the same survey so as to be able to measure the difference between subjectively perceived trustworthiness and real trustworthiness. Key challenges in (lab) games are the focus on specific populations (B) and monetary exchanges (X). Here we need more studies that bring together games with representative random samples (see e.g. Fehr et al. 2002, Ermisch et al. 2009) and investigate in how far trust and trustworthiness regarding monetary exchanges correlate with expectations and behavior in other real life situations (see e.g. Glaeser et al. 2000).

9 Appendix: Similarities and differences to earlier definitions of trust and trustworthiness

I shortly outline the main differences between our conception and earlier conceptions. As mentioned, definitions of trust and trustworthiness are numerous and it is impossible to discuss all definitions. For this reason definitions were chosen according to their influence (Google Scholar citation score, June 2012), their originality and according to whether they both defined trust and trustworthiness together such [Ben-Ner and Halldorsson \(2010\)](#) and [Colquitt et al. \(2007\)](#). Many of them contain important elements on which I draw on in our conception. However, they still display diverse fundamental differences. The differences most commonly found are that they do not conceive trust as a subjective probability, that they do define trust as “trusting behavior” rather than as expectation, that they do mix the concept of trust with considerations on which trust judgments may be based and, finally, that they do restrict the elements ABX in some way. Table 1 gives an overview of the respective definitions and shortly points to the main differences in column 3.

Table 1: Earlier definitions of trust and trustworthiness and main difference to the here presented conception

Author(s)	Definition	Difference
Baier 1986	Baier (1986: 235) asserts that “[t]rust [...] is accepted vulnerability to another’s possible but not expected ill will (or lack of good will) toward one”. ”Trust, I have claimed, is reliance on others’ competence and willingness to look after, rather than harm, things one cares about which are entrusted to their care.” Baier (1986: 259)	Trust \neq subjective probability; Trust = trusting behavior (entrust things to others’ care)
Barber 1983	Barber (1983: 8) outlines that trust describes various types of expectations that social actors have of one another in social relationships and social systems and differentiates between a general one and two specific subtypes whose fulfillment/or not has various functional/dysfunctional consequences for the relationships and social systems in which actors are engaged. The most general is trust as “expectation of the persistence and fulfillment of the natural and the moral social orders” followed by trust as the “expectation of technically competent role performance from those involved with us in social relationships and systems” and finally trust as the “expectation that partners in interaction will carry out their fiduciary obligations and responsibilities, that is, their duties in certain situations to place others’ interests before their own” (Barber 1983: 9).	Trust \neq subjective probability; Barber’s three types of expectations can be fit with our formal statement
Ben-Ner and Halldorsson 2010	”Trusting is the inclination of a person ”A” to believe that other persons ”B” who are involved with a certain action will cooperate for A’s benefit and will not take advantage of A if an opportunity to do so arises. A - the trustor - must therefore be willing to show his or her vulnerability by taking the risk that B - the trustee - may act in a way that does not benefit A. The concept of trusting requires that the action hold the potential of a loss by the trustor; it does not require but is compatible with a potential gain and/or loss by the trustee. Trusting can vary from complete distrusting to complete or ’blind’ trusting.” Ben-Ner and Halldorsson (2010: 65) ; “Trustworthiness is the willingness of a person B to act favorably towards a person A, when A has placed an implicit or explicit demand or expectation for action on B. The implicit demand may entail a situation in which a child is drowning and B is expected to do something to save the child, that B drive with care and stop at pedestrian crossing when A is on the road, or that B reward an investment made by A, like in the trust game.” (Ben-Ner and Halldorsson 2010: 65-66)	Trust \neq subjective probability; Trust = trusting behavior; Trustworthiness = willingness rather than objective probability behavior
Colquitt et al. 2007	“The trust literature distinguishes trustworthiness (the ability, benevolence, and integrity of a trustee) and trust propensity (a dispositional willingness to rely on others) from trust (the intention to accept vulnerability to a trustee based on positive expectations of his or her actions).” (Colquitt et al. 2007: 909)	Trust \neq subjective probability; Trust = intention based on expectation; Trustworthiness \neq objective probability of behavior; Trustworthiness = attributes of trustworthiness

Dasgupta 1988	”’trust’ in the sense of correct expectations about the actions of other people that have a bearing on one’s own choice of action when that action must be chosen before one can monitor the actions of those others.” (Dasgupta 1988: 51); ”In defining trust I have spoken of one’s expectations regarding others’ choice of actions that have a bearing on one’s own choice of action.” (Dasgupta 1988: 53)	Trust \neq subjective probability; Trust = “correct” expectations; B = people; X = people’s actions
Deutsch 1960	Deutsch (1960: 124) describes the essential features of a situation in which an individual is confronted with “a choice to trust or not in the behavior of another person” namely that the “individual is confronted with an ambiguous path, a path that can lead either to an event perceived to be beneficial [...] or to an event perceived to be harmful [...] If he chooses to take an ambiguous path with such properties, I shall say that he makes a trusting choice; if he chooses not to take the path, he makes a distrustful choice.” Deutsch (1960: 124) suggests in which situation one is likely to make this choice, namely “one trusts when one has much to lose or little to gain” and “one needs considerable confidence in a positive outcome to trust”.	Trust \neq subjective probability; Trust = specific decision \neq expectation
Fukuyama 1995 Gambetta 1988	Fukuyama (1995: 26) defines trust as “the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of other members of the community” ”trust (or, symmetrically, distrust) is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he can monitor such action (or independently of his capacity ever to be able to monitor it) and in a context in which it affects his own action (see Dasgupta and Luhmann in particular, this volume).” (Gambetta 1988: 217) ”Firstly, it tells us that trust is better seen as a threshold point, located on a probabilistic distribution of more general expectations, which can take a number of values suspended between complete distrust (0) and complete trust (1), and which is centered around a mid-point (0.50) of uncertainty” (Gambetta 1988: 218) ”In conclusion, trusting a person means believing that when offered the chance, he or she is not likely to behave in a way that is damaging to us, and trust will typically be relevant when at least one party is free to disappoint the other, free enough to avoid a risky relationship, and constrained enough to consider that relationship an attractive option.” (Gambetta 1988: 219)	Trust \neq subjective probability; Trust = “positive” expectation B = (human) agents; X = actions of these agents
Hardin 2002	”trust as encapsulated interest” (Hardin 2002: 1); “I trust you because I think it is in your interest to take my interests in the relevant matter seriously” (Hardin 2002: 1); ”incentive compatibility, while necessary, is not sufficient for that account, which further requires that the trusted values the continuation of the relationship with the truster and has compatible interests at least in part for this reason” (Hardin 2002: 5);	Trust \neq subjective probability; Trust = expectation based on specific considerations C_{A_i} ; A_i knows B_j , e.g. $B_j \neq$ a government
Luhmann 1988	”the problem of the function of trust, which is my primary interest (Luhmann 1979), and which leads to a different approach to conceptual problems” (Luhmann 1988: 95); ”trust is a solution for specific problems of risk” (Luhmann 1988: 95); ”Both concepts [trust and confidence] refer to expectations which may lapse into disappointments.” (Luhmann 1988: 97); ”Trust, on the other hand, requires a previous engagement on your part. It presupposes a situation of risk.” (Luhmann 1988: 97); ”If you choose one action in preference to others in spite of the possibility of being disappointed by the action of others, you define the situation as one of trust.” (Luhmann 1988: 97); ”Moreover, trust is only possible in a situation where the possible damage may be greater than the advantage you seek (Deutsch 1958; 1962: 302ff.)” (Luhmann 1988: 98); ”Trust is only required if a bad outcome would make you regret your action” (Luhmann 1988: 98);	Trust \neq subjective probability; Partly trust = trusting behavior (trust situation)
Mayer, Davis and Schoorman 1995	Mayer, Davis and Schoorman (1995: 712) define trust as the “willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.”	Trust \neq subjective probability; Trust = decision/behavior resulting from expectation; Excludes monitoring/control as basis for trust
Offe 1999	Offe (1999: 47) writes: “Trust is the belief concerning the action that is to be expected from others. The belief refers to probabilities that (certain categories of) others will do certain things or refrain from doing certain things, which in either case affects the well-being of the holder of the belief, as well as possibly the well-being of others or a relevant collectivity”.	B = humans; X = their (non-)actions; well-being instead of preference

Sztompka 1999	“Trust is a bet about the future contingent actions of others” (Sztompka 1999: 25); “trust consists of two main components: beliefs and commitment” (Sztompka 1999: 25); “Trust is more than just contemplative consideration of future possibilities. We must also face the future actively actively, by committing ourselves to action [...] trust involves commitment through action” (Sztompka 1999: 26)	Trust \neq subjective probability; Trust = trusting behavior
Yamagishi and Ya- magishi 1994	“Trust can thus be defined as a bias in the processing of imperfect information about the partner’s intentions. A trusting person is the one who overestimates the benignity of the partner’s intentions beyond the level warranted by the prudent assessment of the available information.” (Yamagishi and Yamagishi 1994: 136)	Trust \neq subjective probability; Trust = bias in expectation rather than as expectation itself
More specific trust concepts		
Hetherington and Husser 2012	“defining political trust as the ratio of people’s evaluation of government performance relative to their normative expectations of how government ought to perform” (Hetherington and Husser 2012: 313)	Trust \neq subjective probability; B = government; Trust = expectation relative to normative expectations instead of preference
Mooradian, Renzl and Matzler 2006	“propensity to trust (that is trait trust, ‘dispositional trust’, or ‘trust’; henceforth ‘propensity to trust’), which is a generalized and enduring predisposition that is neither focused on specific others nor dependent on specific contexts, and which may be related to lifetime experiences but also to temperament, and thereby to genetics and biophysiological structure.” (Mooradian, Renzl and Matzler 2006: 525)	B and X do not matter for trust propensity; Trust \neq subjective probability
Putnam 2000	“Trust embedded in personal relations that are strong, frequent, and nested in wider networks is sometimes called ‘thick trust’. On the other hand, a thinner trust in ‘the generalized other,’ like your new acquaintance from the coffee shop, also rests implicitly on some background of shared social networks and expectations of reciprocity. Thin trust is even more useful than thick trust, because it extends the radius of trust beyond the roster of people whom we can know personally” (Putnam 2000: 136)	Trust \neq subjective probability; B = restricted; X = not specified
Rotter 1967	“Interpersonal trust is defined here as an expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied upon” (Rotter 1967: 651)	Trust \neq subjective probability; B = humans; X = restricted to certain actions
Uslaner 2002	“Generalized trust is the perception that most people are part of your moral community” (Uslaner 2002: 26); “Generalized trust, the belief that “most people can be trusted,” is largely (though not entirely) based upon moralistic trust” (Uslaner 2002: 21); “Placing faith only in our own kind is particularized trust” (Uslaner 2002: 28); “Moralistic trust is not about having faith in particular people or even groups of people. It is a general outlook on human nature and mostly does not depend upon personal experiences or upon the assumption that others are trustworthy, as strategic trust does” (Uslaner 2002: 17); “Moralistic trust is not a prediction of how others will behave. Even if other people turn out not to be trustworthy, moral values require you to behave as if they could be trusted” (Uslaner 2002: 18-19); “Strategic trust reflects our expectations about how people will behave” (Uslaner 2002: 23)	Trust \neq subjective probability; Generalized trust: B = most people, X = unspecified; Particularized trust: B = “own kind” , X = unspecified
Yamagishi and Ya- magishi 1994	“Whereas knowledge-based trust is limited to particular objects (people or organizations), general trust is a belief in the benevolence of human nature in general and thus is not limited to particular objects” (Yamagishi and Yamagishi 1994: 139)	Trust \neq subjective probability; Knowledge-based trust: B = objects known to truster; General trust = general belief, B = humans, X = not specified

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