René Descartes Lectures 2014

Rational Belief

Stability, Reasoning and Action.

Hannes Leitgeb

Ludwig-Maximilians-Universität München

October 20-22, 2014
Tilburg University, the Netherlands

Commentators:

Alexandru Baltag (ILLC/UvA)
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Jan-Willem Romeijn (Groningen)
Gerhard Schurz (Düsseldorf)

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co-located with:

Workshop Full and Partial Belief

A conference of the Tilburg Center for Logic, General Ethics and Philosophy of Science (TiLPS)

Tilburg University

Understanding Society

Rene Descartes Lectures 2014
Program and Abstracts

Tilburg Center for Logic, General Ethics,
and Philosophy of Science (TiLPS)

October 20-22, 2004

Contents

1 Booklet "4th Rene Descartes Lectures"

1.1 (Public) Transport

For the transport from the conference venue to Centraal Station (main station) there are the following options:

	Distance	*Tr. Time*	*Line*	*Departure Times*	*Price*
Bus	Stop *Tilburg University*	10 min	#4,	:11, :23, :41, :53	€3,00/1,20
	Stop *Conservatoriumlaan*	10 min	#2, #3, #4	every 7 min	€3,00/1,20
Taxi		5 min			€10,00

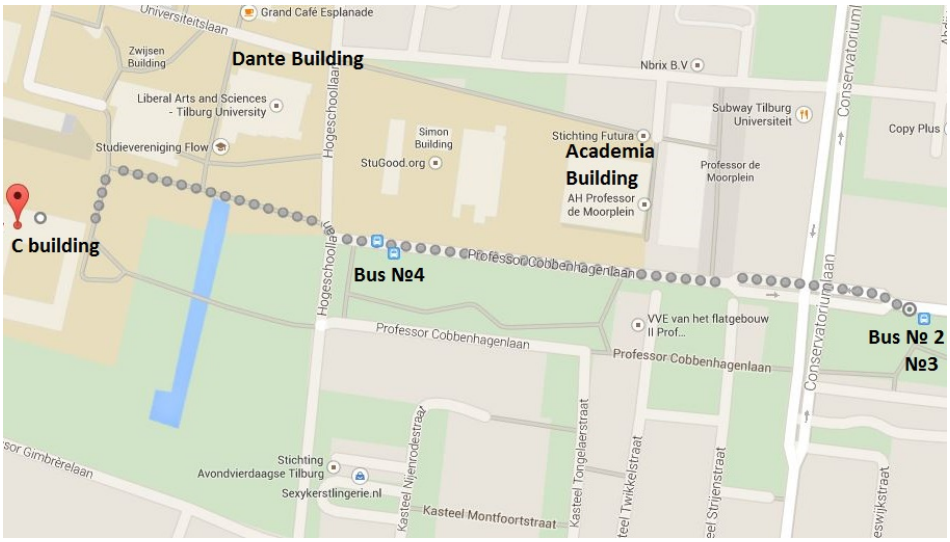
N.B.: Tilburg uses an electronic payment system for public transport, called the *OV-chipkaart*. To promote its use, the price of 'normal' bus tickets has been raised from €1,20 to €3,50. There are two ways of travelling: By buying an OV card or by buying separate tickets.

	Bus	*Train*
With OV card	Charge the card with at least €10. Check in and out every time you travel.	Charge the card with at least €10. Check in and out every time you travel.
Without OV card	1h ticket for €3,50 or a day ticket for €5,50 (after 9am).	Buy a ticket from the ticket machine. Check in and out everytime you travel.

At the central train station ticket machines (picture on next page), you can acquire an OV-chipkaart for €7,50 and charge it with the desired amount. A one-way trip with an OV-chipcard by bus will cost €1,27 and by train €2,20.

Ticket machines accept coins, credit cards, and Dutch bank cards.

Information regarding the use of trains to and from Tilburg can be found on Page 6.



Directions from the venue to the two bus stops.

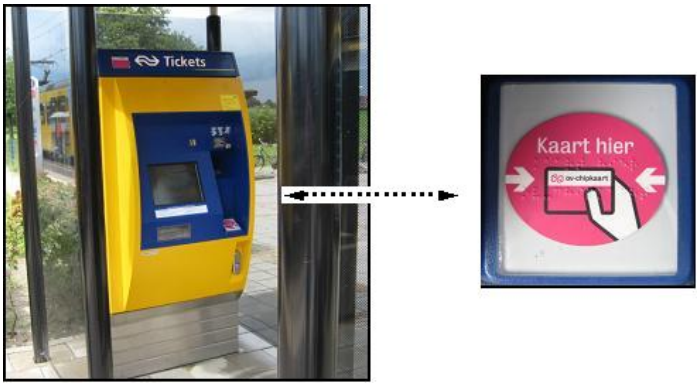


Figure 1: A public transport ticket machine (left). To check in/out, hold your OV-chipkaart against the indicated spot (right).

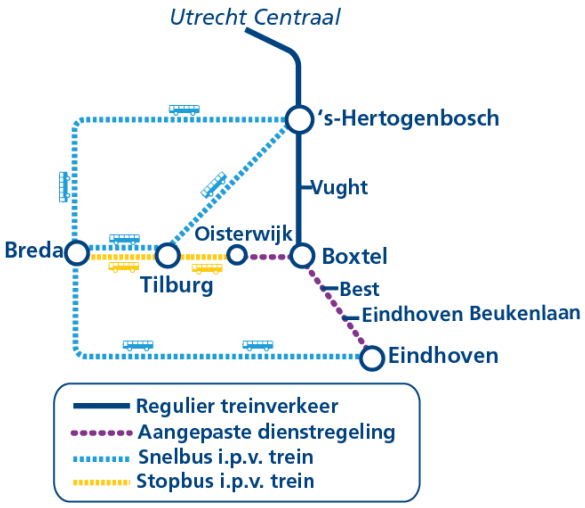


Figure 2: This scheme shows the construction places and the use of buses for those tracks.

1.2 Trains to and from Tilburg, October 20-22, 2014

Unfortunately, in the period of Saturday 18th October to Thursday 23th October, there will be no trains travelling from and to Tilburg, due to construction works. All regular trains will be replaced by buses. (Figure 2)
For the following routes NS express buses travel in both directions:

- Tilburg and 's-Hertogenbosch (Den Bosch)
- Tilburg and Breda
- 's-Hertogenbosch (Den Bosch) and Breda
- Tilburg and Oisterwijk (Train continuing to Eindhoven)

Estimated duration of traveling The time for travelling from Tilburg to another destination or reverse, will depend on the traffic and the travel route. In every direction additional 30 to 60 minutes will be added to your travel.

Plan your trip Plan your trip in advance of the travelling date. Use the Dutch NS planner to estimate the possible obsticles for your trip and what time would it take. The NS planner can be accessed on www.ns.nl. A general directions planner can be accessed on www.9292.nl

1.3 Recommended Taxi Companies

- Taxi Viva: Tel.: +31 (0)13 455 8000
- Station Taxi: Tel.: +31 (0)13 543 2100
- Taxi Centrale Midden Brabant: Tel.: +31 (0)13 583 8383

1.4 Directions to Restaurant *Café Anvers*

Oudemarkt 8, 5038 TJ Tilburg, Tel.: +31 (0)13 5833 533.

Transport options:

	Dist. from Uni	*Tr. Time*	*Line*	*Departure Times*	*Price*
Foot	3.5km	45 min			free!
Bus	Get off at *Centraal Station*.				
	210m	8 min	#4	:11, :23, :41, :53	€3,00/1,20
	650m	7 min	#2, # 3, #4	every 7 min	€3,00/1,20
Taxi	50m	5 min			€12,00

From the central station, it is an easy walk to Café Anvers along Langestraat, or along Stationsstraat and Nieuwlandstraat.

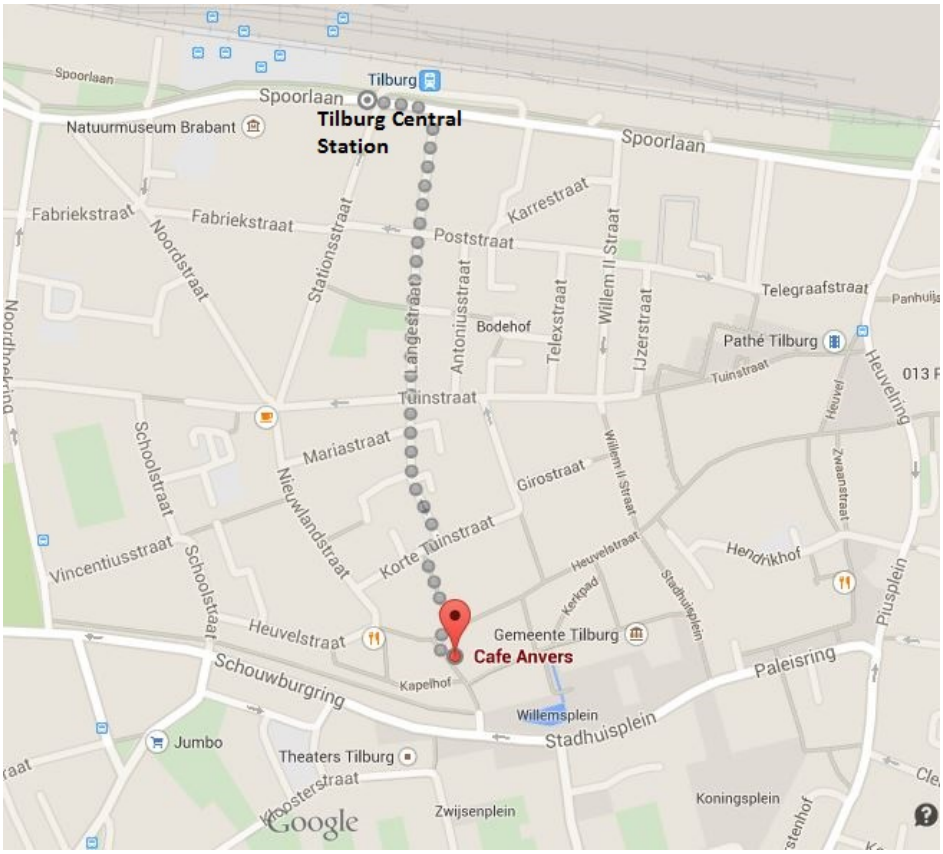


Figure 3: The way to Café Anvers from the Central Station.

1.5 Restaurants

The following list of restaurants is, of course, far from complete and just contains a few suggestions. Generally, the level of prices is higher in the Netherlands than in most other European countries.

Restaurant	*Cuisine*	*Price (Mains)*	*Location*
Biercafe Kandinsky	Bruin Café (Pub)		Telegraafstraat 58
Het Dorstige Hert	Bruin Café (Pub)		Bredaseweg 397
Café Anvers	Belgian/Flemish	€10–20	Oude Markt 8
Café Langeboom	traditional Dutch	€10–15	Nieuwlandstraat 1
Cinque Minuti	Italian	€7–15	Willem II Straat 66
Happy Italy	Italian	€7–15	Heuvelstraat 126
De Imme	vegetarian organic	€10–20	Willem II Straat 52a
De Spaarbank	crossover	€15–20	Noordstraat 125
La Cabana	Spanish	€15–20	Academielaan 73
Minos Pallas	Greek	€15–20	Heuvelring 224
Restaurant Jade	Asian	€15–20	Spoorlaan 406-408
Sumo	Japanese (All you can eat)	€20–25	Heuvel 25-26

1.6 Wireless LAN Access

The computer support has set up a network for the conference participants. You should have reception on the entire campus.

SSID:	Descartes2014
Wireless Key:	Oktober2014

2 Program for Monday, 20 October

Abstracts of the lectures and workshop talks can be found on the following pages. Suggestion: use the space below the abstracts for making notes!

09:30–10:00 Registration

10:00–11:30 **Opening and René Descartes Lecture I**

- Hannes Leitgeb (LMU): The Humean Thesis of Belief

11:30–12:00 Coffee Break

12:00–13:00 **Commentary by Richard Pettigrew (Bristol University) and Discussion**

13:00–14:00 Lunch Break

14:00–16:00 **Contributed Talks**

- Pavel Janda (Bristol University): Reflection Principle and Epistemic Utility of Future Contingents
- Ted Shear and Branden Fitelson (Rutgers University): Diachronic Norms of Rational Full-Belief and the Pressure Toward Stability
- Kevin Kelly and Konstantin Genin (Carnegie Mellon University): An epistemic justification of Ockham's razor

16:00–16:30 Coffee Break

16:30–17:50 **Contributed Talks**

- Lasha Abzianidze (TiLPS): A Logic of Belief with the Notion of Complexity
- Leszek Wronski (Jagiellonian University Krakow): Constraints on credences in two not mutually exclusive propositions: the search for the best belief update function

17:50–18:30 Welcome Reception

The Humean Thesis of Belief

Hannes Leitgeb

Abstract

This lecture develops the theory that it is rational to believe a proposition just in case it is rational to have a stably high degree of belief in it. By means of the probability calculus, a particular interpretation of David Hume's conception of belief in his *Treatise of Human Nature* is explicated.

Reflection Principle and Epistemic Utility of Future Contingents

Pavel Janda

Abstract

We will argue that epistemic utility theory (EUT) combined with MacFarlane's semantics for future contingents creates a clash between two epistemic principles: Reflection Principle and minimization of inaccuracy. We will show that the credence that minimizes an agent's inaccuracy is not the one recommended by the Reflection Principle.

Diachronic Norms of Rational Full-Belief and the Pressure Toward Stability

Ted Shear and Branden Fitelson

Abstract

In this paper, we investigate an accuracy-based treatment of short-term diachronic epistemic norms on rational full-belief. Our account treats epistemic actions as good in so far as they increase the truthlikeness of the agents corpus and are bad in so far as they increase its falselikeness. We maintain that an agent ought to perform an epistemic action just in case it maximizes expected movement towards truth and minimizes expected movement towards falsehood. In this paper, we provide an epistemic decision theory for epistemic actions in a way that results in a pressure towards the stability of full-beliefs. The scoring rule that we rely on is an adaptation of the synchronic scoring rule presented in Easwaran (2014). Our treatment provides an account of how partial-belief constrains virtuous revision of full-belief without accepting that either can be reduced to the other.

An epistemic justification of Ockham's razor

Kevin Kelly and Konstantin Genin

Abstract

Ockham's razor sanctions a preference for the simpler theory compatible with the data. But can that familiar inductive principle be justified? Justifying an epistemic principle requires answering an epistemic question: why are parsimonious theories more likely to be true? (Baker, 2013). However, no inductive inference principle can guarantee a non-trivial upper bound on chance of error over all possibilities compatible with current information. Reliability, or truth-conductiveness, must be understood dynamically: as maximally direct pursuit of truth, even when there is no guarantee that the current conjecture is true. It is not reliable, in that sense, to reverse course more than necessary, to travel in needless circles, or to abandon the truth after one has found it. A method violating the latter desideratum is called unstable. Stability traces its philosophical pedigree back to Plato, and still plays a major role both in the epistemological analysis of knowledge (Lehrer, 1990; Leitgeb, 2014) and in accounts of rational belief change (Grdenfors, 1988; Rott, 2005). Within a topological framework for modeling inductive inference (Kelly, 1996; Schulte and Juhl, 1996; Martin et al., 2006; Yamamoto and de Brecht, 2010; Baltag et al., 2014b,a), we propose an explication of empirical simplicity inspired by Popper (2005). Ockham's vertical and horizontal razors require that one's belief state be, respectively, downward closed and co-initial in the simplicity order restricted to current information. We prove that, in the worst case, (i) Ockham's vertical razor is necessary for stable and for cycle-free convergence to the truth, and (ii) Ockham's horizontal razor is necessary for reversal minimal convergence to the truth.

A Logic of Belief with the Notion of Complexity

Lasha Abzianidze

Abstract

We present a logic of belief that takes into account a com- plexity of believing a sentence, namely, agents are better in believing sentences that are easily derivable from their initial belief set than in believing complex conclusions. It is shown that limited reasoning that is modeled in terms of complexities is sufficient for accounting for inconsistent beliefs and avoiding cases like omnidoxasticity and closure under (valid) implication. The logic also contains elements that are cognitively relevant.

Constraints on credences in two not mutually exclusive propositions: the search for the best belief update function

Leszek Wronski

Abstract

Leitgeb and Pettigrew (2010) describe the following problem. Suppose an agent learns (only) that her new credences for propositions A and B should be p and q, respectively. What is the best rule of belief update, if A and B have a non-empty intersection? For Leitgeb and Pettigrew's sense of "best", I present the best rule for the simplest non-trivial case of four possible worlds and show that it is not transferable to different cases. I show that the answer depends not only on the agent's initial credencies in A, B, and (A and B), but also on the cardinalities of the propositions.

3 Program for Tuesday, 21 October

10:00–11:15 **René Descartes Lecture II**

- Hannes Leitgeb (LMU): Stability and Reasoning

11:15–11:45 Coffee Break

11:45–13:00 **Commentaries by Nina Gierasimczuk (University of Amsterdam) and Jan-Willem Romeijn (RU Groningen)**

13:00–14:00 Lunch Break

14:00–16:00 **Contributed Talks**

- Frederik Herzberg (Bielefeld University): A graded Bayesian coherence notion
- Paul Thorn (Düsseldorf University): Another problem with deductive closure
- Jan Sprenger (TiLPS): Hypothesis Acceptance and Degree of Corroboration

16:00–16:30 Coffee Break

16:30–17:50 **Contributed Talks**

- Wolfgang Spohn (Konstanz University): The value of knowledge
- Gerhard Schurz (Düsseldorf University): Impossibility results for stable rational belief

19:30– Conference Dinner (Café Anvers)

Stability and Reasoning

Hannes Leitgeb

Abstract

This lecture investigates the applications of the emerging theory for suppositional-inductive reasoning on the basis of the beliefs of an agent. The consequences are evaluated with respect to the epistemic accuracy of the acquired beliefs.

A graded Bayesian coherence notion

Frederik Herzberg

Abstract

Coherence is a key concept in many accounts of epistemic justification within 'traditional' analytic epistemology. Within formal epistemology, too, there is a substantial body of research on coherence measures. However, there has been surprisingly little interaction between the two bodies of literature.

The reason is that the existing formal literature on coherence measure operates with a notion of belief system that is very different from — what we argue is — a natural Bayesian formalisation of the concept of belief system from traditional epistemology. Therefore, formal epistemology has so far only been concerned with one particular — arguably not even very natural — way of formalising coherence of belief systems; it has by no means refuted the viability of coherentism. In contrast to the existing literature, we formalise belief systems as families of assignments of (conditional) degrees of belief (which may be compatible with several subjective probability measures).

Within this framework, we propose a Bayesian formalisation of the thrust of BonJour's coherence concept in "The structure of empirical knowledge" (1985), using a combination of Bayesian confirmation theory and basic graph theory. In excursions, we introduce graded notions for both logical and probabilistic consistency of belief systems — the latter being based on certain geometrical structures induced by probabilistic belief systems.

For illustration, we reconsider BonJour's "ravens" challenge (op. cit., p.95f.). Finally, potential objections to our proposed formal coherence notion are explored.

Another problem with deductive closure

Paul Thorn

Abstract

The present article illustrates a conflict between the claim that rational belief sets are closed under deductive consequences, and the claim that the relevant evidence bearing on a proposition is the sole determinant of whether it is rational to believe that proposition. Inasmuch as the latter claim is highly plausible, we have a strong reason to deny that rational belief sets are closed under deductive consequences.

The Value of Knowledge

Wolfgang Spohn

Abstract

Usually, the value of true belief is discussed under this heading. I take this as sufficiently understood. In my talk I rather want to address the alleged surplus value of knowledge over true belief. Specifically, I want to interpret the familiar modal or counterfactual analyses of knowledge (sensitivity analysis, safety analysis) in terms of my ranking-theoretic account of counterfactuals. From there, I will derive that knowledge is stable true belief in a specific sense of stability. However, I do not offer this as an alternative account of knowledge, but as an explanation of its surplus value.

Impossibility results for stable rational belief

Gerhard Schurz

Abstract

In this talk I show that certain rationality postulates for belief contradict each other. I consider the following postulates:

1. Fallibilism (degrees of non-logically determined beliefs should be smaller than 1).
2. Stability (in the sense as defined by Hannes Leitgeb).
3. Semantic differentiation: Rational belief should be compatible with large propositional possibility spaces.
4. Independence: Rational beliefs should be stable under expanding the possibility space by propositions which are probabilistically independent from these beliefs.

I will show that 1,2,3 and 1,2,4 are inconsistent. I will present some further impossibility theorems, explain their relation to the "preface paradox", and discusss their philosophical concequences concerning the following question: In which context should one give up which of these rationality postulates?

4 Program for Wednesday, 22 October

10:00–11:15 **René Descartes Lecture III**

- Hannes Leitgeb (LMU): Stability and Action

11:15–11:45 Coffee Break

11:45–13:00 **Commentaries by Alexandru Baltag (University of Amsterdam) and Gerhard Schurz (Düsseldorf University)**

13:00–14:00 Lunch Break

14:00–16:00 **Contributed Talks**

- Roger Clarke (Queen's University Belfast): Contrastive Belief, Full and Partial
- Weng Hong Tang (National University of Singapore): Belief and Conditional Certainty
- David Atkinson and Jeanne Peijnenburg (RU Groningen): Knowledge and Partial Knowledge

16:00–16:30 Coffee Break

16:30–18:00 **Final Session**

- Branden Fitelson (Rutgers) compares Hannes Leitgeb's coherence requirements for (degrees of) belief to the requirements he develops in his book "Coherence".

18:00–18:30 Farewell Reception

Stability and Action

Hannes Leitgeb

Abstract

This lecture adopts a more pragmatic angle and applies the belief stability theory to topics such as acceptance, action, and assertion.

Contrastive Belief, Full and Partial

Roger Clarke

Abstract

Martijn Blaauw has recently advanced the provocative thesis that belief is essentially contrastive (Blaauw 2013). This thesis has been criticized by Baumann (2008, 2013) and Gerken and Beebe (forthcoming). I provide an alternative version of doxastic contrastivism, which better resists these criticisms. My contrastivism relies on the account of full and partial belief in Clarke (2013). That article claims, crucially to motivating doxastic contrastivism, that full and partial belief are both essentially sensitive to the space of alternative possibilities taken seriously by the believer in a given context; this space of alternatives provides the contrast in contrastive belief.

Belief and Conditional Certainty

Weng Hong Tang

Abstract

How is rational belief related to rational credence? In this paper, I'll defend the thesis that to rationally believe that p is to rationally assign a credence of 1 to p conditional on what is presupposed (where the relevant notion of presupposition will be spelt out in greater detail). The thesis, I'll argue, allows us to hold that we may rationally believe that p without assigning an unconditional credence of 1 to p. It also allows us to hold that rational beliefs are closed under entailment in every context (though not across contexts).

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Knowledge and Partial Knowledge

David Atkinson and Jeanne Peijnenburg

Abstract

It is a platitude that belief comes in degrees, but the same cannot at all be said of knowledge: the received view is that knowledge is not gradable. Recently, however, some dissenting voices have been heard, claiming that knowledge might after all admit of a more or less. We add our voices to this chorus by generalizing the ideas of someone who does not believe that knowledge comes in degrees, namely Timothy Williamson. In the language of possible worlds, knowledge has been defined by Williamson in terms of indiscriminability, conceived as a nontransitive accessibility relation that has sharp edges: a world w? is indiscriminable from world w, or it is not. A set of worlds, R, is known at w if R is true at all worlds that are accessible to w. We generalize Williamson's ideas by introducing the concept of partial knowledge, defined in terms of graded indiscriminability. This is seen as a probabilistic accessibility relation on a set of possible worlds, which has a model in a set of cloned worlds such that the strength of the accessibility of w? from w is proportional to the number of clones of w? that are accessible tout court, in the model, from w. An application of the mean-value theorem in the infinite limit motivates our adoption of a gaussian shape for the graded indiscriminability between possible worlds. The method is illustrated by considering Williamson's modernist clock, which lacks all markings on its dial. Williamson's clock is intended to function as an exemplar of all cases in which knowledge is based upon indiscriminability. We show how to calculate the degree of partial knowledge of an agent concerning the interval in which the present time lies, conditioned on her being at a specified world. Finally, we explain how to compute the agent's partial knowledge, conditioned on her visual evidence (rather than on her being at a given world), with due account of her visual acuity. Partial knowledge goes over smoothly into full knowledge as the time-interval is made larger and larger. Williamson's categorical view of knowledge then serves as a limit case of our framework.

5 Menu for Conference Dinner