Two-Dimensional *De Se* Chance Deference

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Please interrupt

Chance Deference

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- Two problem cases:
  - *a priori* knowable contingencies

Chance Deference

- Principle of chance deference:

  Given that the objective chance of p is $n\%$, you should be $n\%$ sure that p
- Two problem cases:
  - *a priori* knowable contingencies
  - *de se* uncertainty

Two-Dimensional *De Se* Expert Deference

- I will propose a principle of chance deference which handles these problem cases

Two-Dimensional *De Se* Expert Deference

- I will propose a principle of chance deference which handles these problem cases
- In a slogan: defer to chance about whether p.

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Two-Dimensional *De Se* Expert Deference

- I will propose a principle of chance deference which handles these problem cases
- In a slogan: defer to chance about whether your thought ‘*p*’ is true, given the location at which you are entertaining it.

Outline

§1. Lewis's Principle of Chance Deference

§2. A Two-Dimensional, *De Se* Principle of Chance Deference

§3. Sleeping Beauty

§4. In Summation

§1. Lewis's Principle of Chance Deference

Lewis's Principle of Chance Deference

- For any thought p, any number $n\%$, and any time t,

  (LCD) $$C(p \mid \mathcal{C}h_t(p) = n\%) \overset{!}{=} n\%$$

  (so long as you lack any time t inadmissible evidence)

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  - *thoughts* are the arguments of your credence function
  - *Inadmissible* evidence: evidence about the future

Lewis's Principle of Chance Deference

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    - cf. Hawthorne & Lasonen-Aarnio, Salmón, Nolan

Lewis's Principle of Chance Deference

- LCD runs into problems with:
  - *a priori* knowable contingencies
    - cf. Hawthorne & Lasonen-Aarnio, Salmón, Nolan
  - losing track of the time

Problem #1: Contingent *A Priori*

- We will flip this coin.

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- Let's call whichever side of the coin actually lands facing up 'Uppy'.

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- $u :=$ The coin lands on Uppy

Problem #1: Contingent *A Priori*

$$C(p \mid \mathcal{C}h_t(p) = n\%) \stackrel{!}{=} n\% \qquad \text{(LCD)}$$

Problem #1: Contingent *A Priori*

(LCD) $$C(p \mid \mathcal{C}h_t(p) = n\%) \overset{!}{=} n\%$$

Problem #1: Contingent *A Priori*

(LCD) $$C(u \mid \mathcal{C}h_t(u) = 50\%) \stackrel{!}{=} 50\%$$

Problem #1: Contingent *A Priori*

$$C(u \mid \mathcal{C}h_t(u) = 50\%) \stackrel{!}{=} 50\% \tag{LCD}$$

Problem #1: Contingent *A Priori*

$$C(u) = 50\% \qquad \text{(LCD)}$$

Problem #1: Contingent *A Priori*

(LCD) $$C(u) = 50\%$$

- But it is *a priori* knowable that the coin lands on Uppy

Problem #2: Losing Track of the Time

	$Ch_{mon}(m)$	$Ch_{tues}(m)$	$Ch_{wed}(m)$
It is Tuesday	25%	75%	–
It is Wednesday	–	25%	75%

Problem #2: Losing Track of the Time

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	$\mathcal{C}h_{mon}(m)$	$\mathcal{C}h_{tues}(m)$	$\mathcal{C}h_{wed}(m)$
It is Tuesday	25%	75%	–
It is Wednesday	–	25%	75%

Problem #2: Losing Track of the Time

- So LCD implies:

$$C(m \mid Ch_{tues}(m) = 25\%) \stackrel{!}{=} 25\%$$
$$C(m \mid Ch_{tues}(m) = 75\%) \stackrel{!}{=} 75\%$$

Problem #2: Losing Track of the Time

- So LCD implies:

$$C(m \mid Ch_{tues}(m) = 25\%) \stackrel{!}{=} 25\%$$

$$C(m \mid Ch_{tues}(m) = 75\%) \stackrel{!}{=} 75\%$$

Problem #2: Losing Track of the Time

- So LCD implies:

$$C(m \mid weds) \stackrel{!}{=} 25\%$$

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- So LCD implies:

$$C(m \mid weds) \stackrel{!}{=} 25\%$$

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▹ This implies:

$$\begin{aligned} C(m) &= 75\% \cdot C(tues) + 25\% \cdot C(weds) \\ &= 75\% \cdot 50\% + 25\% \cdot 50\% \\ &= 50\% \end{aligned}$$

Problem #2: Losing Track of the Time

- This is implausible. You know that the current chance of ‘*m*’ is 75%, so you should be 75% sure that *m*.

Chance Deference

- Lewis's principle has difficulty...

Chance Deference

- Lewis's principle has difficulty...
  - ...with thoughts like 'the coin lands on Uppy'

Chance Deference

- Lewis's principle has difficulty...
  - ...with thoughts like 'the coin lands on Uppy'
  - ...when you've lost track of the time.

§2. A Two-Dimensional, *De Se* Principle of Chance Deference

Deference to my Doctor

- Principle of doctor deference:

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  Given that my doctor is *n*% confident in '*p*', I should be *n*% confident in '*p*'.

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- Principle of doctor deference:

  Given that my doctor is n% confident in 'I am sick', I should be n% confident in 'I am sick'.

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- 'δ' is Dmitri's *location*

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- 's_δ' is the *de dicto* δ-surrogate of 's'.

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$$C(s \mid \mathcal{D} = D) \overset{!}{=} D(s_\delta)$$

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§2. A Two-Dimensional, *De Se* Principle of Chance Deference

Locations and *De Dicto Surrogates*

Locations

- *Purely de se* thoughts only say who, when, and where you are, and don't say anything else about the world

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Locations

- *Purely de se* thoughts only say who, when, and where you are, and don't say anything else about the world
  - 'Today is Monday', 'I am Beyoncé'
- A *location* is a thought which settles the truth-value of all of your purely *de se* thoughts (and doesn't settle the truth-value of anything more)

De dicto Surrogates

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- So 'p_λ' says: "the thought 'p' expresses a truth, when entertained at λ"

De dicto Surrogates and Deference

$$C(s \mid \mathcal{D} = D) \stackrel{!}{=} D(s_\delta)$$

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De dicto Surrogates and Deference

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- 'δ' is Dmitri's location
- 's_δ' says that 'I am sick' expresses a truth, when entertained at δ.
  - That is: 's_δ' says that Dmitri is sick

Problem #1: Contingent *A Priori*

- ‘*u*’ says that the coin lands on Uppy

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- ‘u’ says that the coin lands on Uppy

$$C(u \mid \mathcal{C}h = Ch) \stackrel{!}{=} Ch(u)$$

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  - ▹ Let 'λ' be your (known) location

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Problem #1: Contingent *A Priori*

- ‘u’ says that the coin lands on Uppy

$$C(u \mid \mathcal{C}h = Ch) \stackrel{!}{=} 100\%$$

  - Let ‘λ’ be your (known) location
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Problem #1: Contingent *A Priori*

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$$C(u \mid Ch = Ch) \overset{!}{=} 100\%$$

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  - ▹ 'u_λ' says that your thought 'u' expresses a truth

Problem #1: Contingent *A Priori*

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Locations and Deference

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- Suppose I don't know whether I'm Dmitri or Beyoncé
  - Given that I am Dmitri and my doctor is n% sure that Dmitri is sick, I should be n% confident in 'I am sick'
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Locations and Deference

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$$C(s \mid \mathcal{D} = D \wedge \delta) \stackrel{!}{=} D(s_\delta)$$
$$C(s \mid \mathcal{D} = D \wedge \beta) \stackrel{!}{=} D(s_\beta)$$

Two-Dimensional *De Se* Deference

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Given that the expert $\mathcal{E}$'s probability function is E, and given that you are located at λ, your credence in 'p' should be E's credence in the *de dicto* λ-surrogate of 'p', 'p_λ'.

$$C(p \mid \mathcal{E} = E \wedge \lambda) \stackrel{!}{=} E(p_\lambda)$$

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- Slogan: Defer to the expert about whether your thoughts are true, given the location at which you are entertaining them.

§2. A Two-Dimensional, *De Se* Principle of Chance Deference

Chance Deference

Two-Dimensional *De Se* Chance Deference

Two-Dimensional *De Se* Chance Deference
So long as you lack any time t inadmissible information, your credence in 'p', given that the time t objective chance function is Ch_t and given that you are located at λ, should be equal to $Ch_t(p_\lambda)$.

$$C(p \mid \mathcal{C}h_t = Ch_t \wedge \lambda) \stackrel{!}{=} Ch_t(p_\lambda)$$

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$$C(p \mid \mathcal{C}h_t = Ch_t \wedge \lambda) \stackrel{!}{=} Ch_t(p_\lambda)$$

- Slogan: Defer to chance about whether your thoughts are true, given the location at which you are entertaining them.

Inadmissible Information

Assuming ur-prior conditionalization:

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- When your total evidence is admissible, $Ch_t(p_\lambda \mid e_\lambda) = Ch_t(p_\lambda)$

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- When your total evidence is admissible,
  $Ch_t(e_\lambda) = 100\%$

Inadmissible Information

Assuming ur-prior conditionalization:

$$C(p \mid \mathcal{C}h_t = Ch_t \wedge \lambda) \stackrel{!}{=} Ch_t(p_\lambda \mid e_\lambda)$$

- When your total evidence is admissible, $Ch_t(e_\lambda) = 100\%$
- So let's say: *e* is *inadmissible* at *t* iff $\mathcal{C}h_t(e_\lambda) < 100\%$.

Inadmissible Information (Lewis)

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e is *inadmissible* for the time t chances iff e is about times after t

Inadmissible Information

Inadmissible Information

e is *inadmissible* for the time *t* chances iff, for some potential location λ and some potential time *t* chance function Ch_t,

$$Ch_t(e_\lambda) < 100\%$$

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e is *inadmissible* for the time t chances iff, for some potential location λ and some potential time t chance function Ch_t,

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Inadmissible Information

Inadmissible Information
e is *inadmissible* for the time t chances iff, for some potential location λ and some potential time t chance function Ch_t,

$$Ch_t(e_\lambda) < 100\%$$

- Slogan: e is inadmissible just in case it might be news to the objective chances

Two-Dimensional *De Se* Chance Deference

Two-Dimensional *De Se* Chance Deference (v2)
If 'e' is your time t inadmissible information, then your credence in 'p', given that the time t objective chance function is Ch_t and given that you are located at λ, should be equal to $Ch_t(p_\lambda \mid e_\lambda)$.

(CD) $$C(p \mid \mathcal{C}h_t = Ch_t \wedge \lambda) \stackrel{!}{=} Ch_t(p_\lambda \mid e_\lambda)$$

Two-Dimensional *De Se* Chance Deference

Two-Dimensional *De Se* Chance Deference (v2)
If '*e*' is your time *t* inadmissible information, then your credence in '*p*', given that the time *t* objective chance function is Ch_t and given that you are located at λ, should be equal to $Ch_t(p_\lambda \mid e_\lambda)$.

(CD) $$C(p \mid \mathcal{C}h_t = Ch_t \wedge \lambda) \stackrel{!}{=} Ch_t(p_\lambda \mid e_\lambda)$$

Problem #2: Losing Track of the Time

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	$\mathcal{C}h_{mon}(m)$	$\mathcal{C}h_{tues}(m)$	$\mathcal{C}h_{wed}(m)$
It is Tuesday	25%	75%	–
It is Wednesday	–	25%	75%

- $\tau :=$ 'It is Tuesday'

Problem #2: Losing Track of the Time

	$\mathcal{C}h_{mon}(m)$	$\mathcal{C}h_{tues}(m)$	$\mathcal{C}h_{wed}(m)$
It is Tuesday	25%	75%	–
It is Wednesday	–	25%	75%

- $\tau :=$ 'It is Tuesday'
- $\omega :=$ 'It is Wednesday'

Problem # 2: Losing Track of the Time

- '$\mathcal{C}h_{today}(m) = 75\%$' is inadmissible for the Tuesday chances

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- '$\mathcal{C}h_{today}(m) = 75\%$' is inadmissible for the Tuesday chances
  - ▹ Wednesday is a potential location, and '$\mathcal{C}h_{today}(m) = 75\%_{\omega}$' is news to the Tuesday chances

Problem # 2: Losing Track of the Time

- '$\mathcal{C}h_{today}(m) = 75\%$' is inadmissible for the Tuesday chances
  - Wednesday is a potential location, and '$\mathcal{C}h_{today}(m) = 75\%_{\omega}$' is news to the Tuesday chances

Problem # 2: Losing Track of the Time

- '$\mathcal{C}h_{today}(m) = 75\%$' is inadmissible for the Tuesday chances
  - Wednesday is a potential location, and '$\mathcal{C}h_{wed}(m) = 75\%$' is news to the Tuesday chances

Problem # 2: Losing Track of the Time

- '$\mathcal{C}h_{today}(m) = 75\%$' is inadmissible for the Tuesday chances
  - Wednesday is a potential location, and '$\mathcal{C}h_{wed}(m) = 75\%$' is news to the Tuesday chances
- So: CD won't say that your credence in 'm', given that it's Wednesday, should be 25%.

Problem # 2: Losing Track of the Time

- '$\mathcal{C}h_{today}(m) = 75\%$' is inadmissible for the Tuesday chances
  - Wednesday is a potential location, and '$\mathcal{C}h_{wed}(m) = 75\%$' is news to the Tuesday chances
- So: CD won't say that your credence in 'm', given that it's Wednesday, should be 25%.
- In fact: it will say that $C(m \mid weds)$ should be 75%.

In Summary

- CD solves the two problems from §1.

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  - ▹ it permits certainty in *a priori* knowable contingencies

In Summary

- CD solves the two problems from §1.
  - it permits certainty in *a priori* knowable contingencies
  - it gives plausible advice about how to defer to chance when you've lost track of the time

§3. Sleeping Beauty

Sleeping Beauty

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- On Sunday, you will be put to sleep with a powerful sedative and awoken on Monday morning

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- On Sunday, you will be put to sleep with a powerful sedative and awoken on Monday morning
- On Monday evening, you will be put back to sleep and a fair coin will be flipped.
  - If it lands heads, then you will not awoken until Wednesday.

Sleeping Beauty

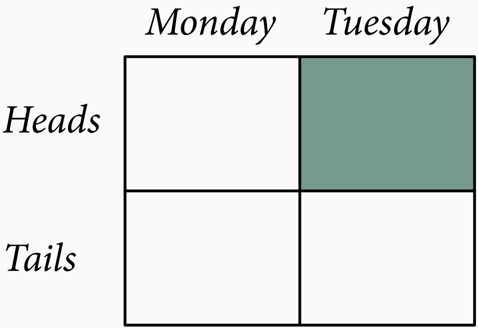
- On Sunday, you will be put to sleep with a powerful sedative and awoken on Monday morning
- On Monday evening, you will be put back to sleep and a fair coin will be flipped.
  - If it lands heads, then you will not awoken until Wednesday.
  - If it lands tails, then your memories of Monday will be erased and you will be awoken again on Tuesday

Sleeping Beauty

- On Sunday, you will be put to sleep with a powerful sedative and awoken on Monday morning
- On Monday evening, you will be put back to sleep and a fair coin will be flipped.
  - If it lands heads, then you will not awoken until Wednesday.
  - If it lands tails, then your memories of Monday will be erased and you will be awoken again on Tuesday
  - Also, you're beautiful

Sleeping Beauty

Monday morning:



Sleeping Beauty

Monday morning:

	Monday	*Tuesday*
Heads	*1/3*	
Tails	*1/3*	*1/3*

Sleeping Beauty

Monday morning:

	Monday	*Tuesday*
Heads	1/2	
Tails	1/4	1/4

Sleeping Beauty

- ‘h’ = ‘The coin lands heads’

Sleeping Beauty

- ‘h’ = ‘The coin lands heads’
- ‘μ’ = ‘It is Monday’

Sleeping Beauty

- ‘h’ = ‘The coin lands heads’
- ‘μ’ = ‘It is Monday’
- ‘τ’ = ‘It is Tuesday’

Sleeping Beauty

- ‘h’ $=$ ‘The coin lands heads’
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Sleeping Beauty

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	Monday	*Tuesday*
Heads	*1/2*	
Tails	*1/4*	*1/4*

Sleeping Beauty

$$C(h \mid \mu) \stackrel{!}{=} 50\%$$

	Monday	*Tuesday*
Heads	*2/3*	
Tails	*1/3*	

Sleeping Beauty

$$C(h \mid \mu) \overset{!}{=} 50\%$$

	Monday	*Tuesday*
Heads	1/3	
Tails	1/3	1/3

Sleeping Beauty

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	Monday	*Tuesday*
Heads	*1/2*	
Tails	*1/2*	

Sleeping Beauty

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    - Not evidence *about* the future
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§4. In Summation

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- Principles of chance deference have difficulties with thoughts like...

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    - ...'The coin lands on Uppy'

In Summation

- Principles of chance deference have difficulties with thoughts like...
    - ...‘The coin lands on Uppy’
    - ...‘The current chance of ‘*p*’ is *n*%’

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- I proposed a modification of principles of expert deference:

$$C(p \mid \mathcal{E} = E \wedge \lambda) = E(p_\lambda)$$

In Summation

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In Summation

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  - ...says that your credence in *a priori* contingencies like 'the coin lands Beatrice up' should be 100%
  - ...gives sensible advice about how to defer to chance when you've lost track of the time
  - ...is consistent with the *thirder*'s—but not the *halfer*'s—solution to the *Sleeping Beauty* puzzle

Loppu