**The A-theory, the B-theory, and Temporal Counterpart Theory**

Cian Dorr
St Andrews, 15/2/2012

1. **A-theory/B-theory: two questions**
2. Propositional eternalism and temporalism
3. Temporal elitism and egalitarianism
4. The primordial objection to the B-theory
5. The argument from spacetime
6. Temporal counterpart theory
7. A new kind of A-theory

**Slogans**

<table>
<thead>
<tr>
<th>The A-theory</th>
<th>The B-theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>The present time is metaphysically special.</td>
<td>All times are “on a par”.</td>
</tr>
<tr>
<td>There are facts about which times are past, present and future, over and above the facts about which times are before which.</td>
<td>There are no such further facts. Pastness, presentness and futurity “reduce” to beforeness and afterness.</td>
</tr>
<tr>
<td>Time genuinely “flows” and “passes”. There is “objective becoming”.</td>
<td>We live in a “block universe”.</td>
</tr>
<tr>
<td>The facts themselves change.</td>
<td>Change is just a certain kind of pattern in the facts.</td>
</tr>
</tbody>
</table>

**My questions**

- **T1**: Are there temporarily true propositions?
  - Yes: ‘Propositional temporalism’
  - No: ‘Propositional eternalism’

- **T2**: Is the unit class of the present instant much more natural than those of most instants?
  - Yes: ‘Temporal elitism’
  - No: ‘Temporal egalitarianism’

— Why put T2 this way?

**Modal analogues of these questions**

- **M1**: Are there contingently true propositions?
  - Yes: ‘Propositional contingentism’
  - No: ‘Propositional necessitism’

- **M2**: Is the unit class of the actual world much more natural than those of most worlds?
  - Yes: ‘Modal elitism’
  - No: ‘Modal egalitarianism’

**A further question about “flow”?**

- 1. For each instant t: at t, t is the only present instant.
- 2. Some instant t is after the present instant.
- 3. If there is an instant t after the present such that at t, \( \phi \), then it will be the case that \( \phi \).
- 4. So for some instant t that is not present, it will be the case that t is the only present instant.
- 5. So presentness is not “frozen”.

**A further question about “primitiveness”?**

The A-theoretic outlook is consistent with regarding ‘At some instant t that is after the present, \( \phi \)’ as a reductive definition of ‘It will be the case that \( \phi \)’.

- So, A-theorists need not regard tense operators as ‘primitive’ or ‘fundamental’.
- If you are determined to construe A-theory as a thesis about fundamentality, it should be the thesis that the fundamental facts undergo change, not the thesis that “change” or any other particular bit of time-related vocabulary is fundamental.
- But this thesis is not an optional extra for my A-theorists, (assuming they go in for talk about fundamentality).
### Instant: the basic role

<table>
<thead>
<tr>
<th>Symbol(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{At-})</td>
<td>at some past instant, ( \varphi )</td>
</tr>
<tr>
<td>( \text{At+})</td>
<td>at some future instant, ( \varphi )</td>
</tr>
<tr>
<td>( \text{At-})</td>
<td>at some ( t' ) before ( t ), ( \varphi )</td>
</tr>
<tr>
<td>( \text{At+})</td>
<td>at some ( t' ) after ( t ), ( \varphi )</td>
</tr>
<tr>
<td>( \text{Permanence})</td>
<td>if ( \varphi ) at ( t ), ( \varphi ) always: at ( t ), ( \varphi )</td>
</tr>
</tbody>
</table>

### Elitists should be temporalists

Suppose you think that the proposition, concerning the present instant, that its unit class is more natural than most other times is true. You would have to be mad to think that this proposition is eternally true!

### Non-factualism and relativism

Non-factualism about non-eternal propositions:
- Propositions change their truth values, but PROPOSITIONS do not
- Some propositions are sometimes true and sometimes false, but no proposition is sometimes FACTUALLY true and sometimes FACTUALLY false.
- The facts change, but the \( \text{P+}\text{FACTS}\text{+T-S} \) don't change.

If you can make sense of this ideology, you can use it to resist the argument from temporalism to elitism: only properties whose instantiation is a factual matter make for naturalness.

### Is the temporal B-theory horrible too?

**Yes.**

1. The “primordial objection” is an objection to anyone who denies (e.g.) that \( t \) is standing simpliciter (as opposed to standing at this or that \( t \)), or the Earth is warming simpliciter.
2. It makes no difference if we posit some other entities—our instantaneous temporal parts—and claim that they are standing simpliciter.
3. Also, the problem has nothing to do with intrinsics. It applies to obviously extrinsic properties like being surrounded by bees. It applies to properties which instantaneous temporal parts do not instantiate according to Lewis, like being a child and being a kind person.
### The manifold hypothesis

Every true proposition is entailed by
- Truths about which spacetime points and regions there are.
- Truths which characterise the (4d) topological and differential structure of spacetime.
- Truths which characterise the distribution of certain physical fields over spacetime.
- An appropriate `that's all` claim.

**AND:** the spacetime manifold is homogeneous.
- There is no especially natural way to single out a 3d region.
- Thus, nothing like the `glow of presentness`, e.g. no natural `degree of futurity` field.

---

**From the manifold hypothesis to the B-theory**

**Key Premise:** If the manifold hypothesis is true, instants of time are hyperplanes.

1. If the manifold hypothesis is true, no hyperplane has a very natural unit class.
2. So, if the manifold hypothesis is true, no instant of time has a very natural unit class.
3. So, if the manifold hypothesis is true, temporal egalitarianism is true.
   - Officially, temporal elitism only requires the unit class of the present instant to be more natural than those of other instants. But there is no plausible way out here.
   - I'm interested in the strategy of denying the Key Premise.

---

**Basic temporal counterpart theory**

**BTCT**

\[
F\Phi(a) := \exists x(C_{xa} \land \Phi(x))
\]

\[
P\Phi(a) := \exists x(C_{xa} \land \Phi(x))
\]

- `C_{xa}` means `x is a future-counterpart of a`;
- `C_{xa}` means `x is a past-counterpart of a`.

These are placeholders which different proponents of BTCT can fill in in different ways.
- `\Phi` must be qualitative except for one or more occurrences of the singular term `a`.

---

**Counterpart theorists escape the primordial objection**

Lewis escapes the primordial objection to the modal B-theory.
- For him, there is a perfectly good question whether Hubert Humphrey is ever president (absolutely, *simpliciter*), which is quite different from all the questions about whether he is ever president `at w`.

Likewise, temporal counterpart theorists escape the primordial objection to the temporal B-theory.
- There is a perfectly good question whether Herman is sitting (absolutely, *simpliciter*), which is quite different from all the questions about whether he is sitting `at t`.

---

**What about multiply de re claims?**

**First bad idea:**

\[
\text{WILL } \Phi(a,b) := \exists \exists y(C_{xa} \land C_{yb} \land \Phi(x,y))
\]

\[
\text{WAS } \Phi(a,b) := \exists \exists y(C_{xa} \land C_{yb} \land \Phi(x,y))
\]

- Singleton-Herman will fail to have Herman as a member.
- WAS (Herman is asleep and Prop is false), where Prop is the proposition that Herman is asleep.
- There are infinitely many people who have been mothers of Prince Charles.
- There are infinitely many people who have been identical to Prince Charles.
- There are infinitely many people who have lived in North America.

---

**Second bad idea:**

\[
\text{WILL } \Phi(a,b) := \exists \exists y(C_{xa} \land C_{yb} \land H_{xy} \land \Phi(x,y))
\]

\[
\text{WAS } \Phi(a,b) := \exists \exists y(C_{xa} \land C_{yb} \land H_{xy} \land \Phi(x,y))
\]

- `H` might be something like `belongs to the same hyperplane`.
- This does not resolve the Prince Charles problem.
- Any two things, even if they are not H-related, will always be H-related, and will always have been H-related.

---

**What about purely qualitative claims?**

The natural extension of BCTC to purely qualitative `\Phi`:

\[
\text{WILL } \Phi \ := \Phi
\]

\[
\text{WAS } \Phi \ := \Phi
\]

- *Argument:* let a be something that has a future-counterpart, and let `F` be a qualitative predicate.
- Then `\text{WILL } \Phi`
  - `\text{WILL } (\Phi \land (F \land \neg F))` [by tense logic]
  - `\text{WILL } 3x(C_{xa} \land \Phi \land (F \land \neg F))` [by BCTC]

**All change is de re change**
Better idea:
WILL \( \phi(a,b) := \exists x \exists y (\mathcal{P}(R) \land Rx \land Ry \land \phi(x,y)) \)
WAS \( \phi(a,b) := \exists x \exists y (\mathcal{P}(R) \land Rx \land Ry \land \phi(x,y)) \)
- \( \mathcal{P}(R) \) means ‘R is a past-counterpairing’.
- If we have the notion of an ‘n-second counterpart’ (for real n, and think that each thing has at most one n-second counterpart, we could understand \( \mathcal{P}(R) \) to mean \( \exists n > 0 \forall x \forall y (Rx \land Ry \land \mathcal{P}(x,y)). \)
- Suppose Herm1 is Herman’s +60-second counterpart, and Herm2 is Herm’s +60-second counterpart. Let H1 and H2 be Herm1’s and Herm2’s qualitative profiles. When Herman has H1, Herm1 will have H2.
- Herman will never be identical to anyone else.

Counterparts and propositional temporalism
We must respect the temporal T-schema:
The proposition that \( \phi(a) \) is such that ALWAYS, it is true iff \( \phi(a) \).
- This is easy. Just say that for any qualitative \( \phi \), counterpairing \( R \), objects \( x \) and \( y \), and propositions \( p, q \), if \( Rx \land Ry \land Rp \) and \( p = \) the proposition that \( \phi(x) \), then \( q = \) the proposition that \( \phi(y) \).

Counterparts and temporal elitism
What plays the instant role?
\[
\begin{align*}
\text{At-F} & : \text{It will be that } \varphi \text{ iff at some future instant, } \varphi \\
\text{At-P} & : \text{It has been that } \varphi \text{ iff at some past instant, } \varphi \\
\text{At-\&} & : \text{At } t, \varphi \text{ and } \psi \text{ iff at } t, \varphi \text{ and at } t, \psi \\
\text{At-\lor} & : \text{At } t, \varphi \text{ or } \psi \text{ iff at } t, \varphi \text{ or at } t, \psi \\
\text{At-\neg} & : \text{At } t, \neg \varphi \text{ iff not: at } t, \varphi \\
\text{F-<} & : \text{At } t, \varphi \text{ iff at some } t' \text{ after } t, \varphi \\
\text{P-<} & : \text{At } t, \varphi \text{ iff at some } t' \text{ before } t, \varphi
\end{align*}
\]
- Suggestion: ‘at h, \( \Phi(a) \)’ means ‘\( \exists x (x \text{ is a temporal counterpart of } a \land x \text{ is “located” in } h) \land \Phi(x) \)’.
- But this will give us the view on which infinitely many people have been mothers of Prince Charles, etc. This is not the case on our version of temporal counterpart theory!

A better answer: counterpairings
x is a future instant := x is a future-counterpairing
x is a past instant := x is a past-counterpairing
x is a present instant := x is the identity relation
- Provided that we require that \( \forall x \forall y (Rxy \land Rxz \rightarrow y = z) \), this will give us all the role barring Permanence.
- And clearly, the unit class of the identity relation is much more natural than the unit classes of most counterpairings. So temporal elitism is vindicated.

What about Permanence?
If we accept plausible essentialist claims about mathematical entities, then counterpairings (construed as mathematical functions) do not obey Permanence.
- If we want an ontology of instants, we need to posit them as something new: each instant “corresponds to” a counterpairing, but not always the same one.
- The present instant is the one that corresponds to the identity counterpairing. This looks like a natural feature!