

Negative Association Error

by Sven Nilsen, 2020

In this paper I explain the error of making negative associations in Path Semantical Logic.

In Path Semantical Logic^[1], there is an error which is easy to make because of the special semantics. This error got nothing to do with Path Semantical Logic itself, but it can be interpreted incorrectly.

Negative Association is an error where it looks like equality carries over to lower levels:

$$\begin{array}{l} (a, b) (T, U): \\ a=b, \neg a(T), \neg b(U) \Rightarrow T=U \end{array}$$

Where the tuple `(a, b)` has level 1 and the tuple `(T, U)` has level 0.
The notation `a(T)` means `a=>T` where `T` is at a lower level.

Although this might seem wrong, it is not wrong because Path Semantical Logic is wrong.
On the contrary, this is a tautology^[2] in normal Propositional Logic^[3]:

$$\begin{array}{l} a, b, T, U: \\ a=b, \neg(a \Rightarrow T), \neg(b \Rightarrow U) \Rightarrow T=U \end{array}$$

The reason is that the following two expressions are equivalent:

$$\neg a(T) \quad \Leftrightarrow \quad a \wedge \neg T$$

Therefore, one says `¬T` which is the same as `T = false`.
Since both `T` and `U` are false, of course they are equal.

References:

- [1] “Path Semantical Logic”
AdvancedResearch, reading sequence on Path Semantics
https://github.com/advancedresearch/path_semantics/blob/master/sequences.md#path-semantical-logic

- [2] “Tautology (logic)”
Wikipedia
[https://en.wikipedia.org/wiki/Tautology_\(logic\)](https://en.wikipedia.org/wiki/Tautology_(logic))

- [3] “Propositional calculus”
Wikipedia
https://en.wikipedia.org/wiki/Propositional_calculus