$$\sum_{t \in \mathbf{T}} \int_a^t \left\{ \int_a^t f(t-x)^2 \, g(y)^2 \, dx \right\} dy$$
$$= \sum_{t \notin \mathbf{T}} \int_t^a \left\{ g(y)^2 \int_t^a f(x)^2 \, dx \right\} dy \quad (2)$$

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