Suppose variable declaration with initialization is defined as
\[
\text{\texttt{var } x: T := e \cdot P} = \text{\texttt{var } x: T \cdot x := e \cdot P}
\]

In what way does this differ from the definition given in Subsection 5.0.0?

§

According to Subsection 5.0.0,
\[
\begin{align*}
\text{\texttt{var } x: T := e \cdot P} & \equiv \\
\exists x: e \cdot \exists x': T \cdot P & \equiv \\
\text{(for } x \text{ substitute } e \text{ in } \exists x': T \cdot P) & \text{ assuming } T \text{ cannot mention } x \\
& \text{ and } e \text{ cannot mention } x' \\
& \equiv \\
\exists x': T \cdot \text{(for } x \text{ substitute } e \text{ in } P) & \text{ assuming } e \text{ cannot mention } x \\
\exists x: T \cdot \exists x': T & \equiv \\
\exists x, x': T \cdot (x := e \cdot P) & \text{ substitution law} \\
\text{\texttt{var } x: T := x := e \cdot P} & \equiv \\
\exists x, x': x := e \cdot P & \equiv \\
\exists \langle x: x := e \cdot P \rangle & \text{ With the three assumptions, there's no difference. So let's violate those assumptions. First, let } T = x+1. \\
\text{\texttt{var } x: x+1 \cdot x := e \cdot P} & \equiv \\
\exists x, x': x+1 \cdot (x := e \cdot P) & \equiv \\
\exists \langle x: x+1 \cdot x := e \cdot P \rangle & \text{ Section 3.0 defines a function by saying “Let } v \text{ be a name, and let } D \text{ be a bunch of items (possibly using previously introduced names but not using } v), \ldots”\text{. We do not have a definition of } \langle x: x+1 \cdot \ldots \rangle. \\
\end{align*}
\]

Next, suppose } e = x+1. \\
\text{\texttt{var } x: T := x+1 \cdot P} & \equiv \\
\exists x: x+1 \cdot \exists x': T \cdot P & \equiv \\
\exists \langle x: x+1 \cdot \exists x': T \cdot P \rangle & \text{ So again we do not have a definition of } \langle x: x+1 \cdot \ldots \rangle. \\
\text{Last, suppose } e = x'+1. \\
\text{\texttt{var } x: T := x'+1 \cdot P} & \equiv \\
\exists x: x'+1 \cdot \exists x': T \cdot P & \equiv \\
\exists \langle x: x'+1 \cdot \exists x': T \cdot P \rangle & \text{ The } x' \text{ appearing first is not the same variable as the } x' \text{ appearing second.}