Parameter	Control technique		Measured/Ensured	
	How?	Why?	How?	Why?
Individual background				
Color blindness	Constant	Irrelevant for our setting	Not measured	No color perception
Culture	Constant	To avoid noise	Participants from Germany	Have the same cultural background
Gender	Mostly male participants	To avoid noise	Asked participants	Reliable
Intelligence	Randomization	No resources for measurement		
Individual knowledge				
Ability	Randomization	No resources for measurement		
Domain knowledge	Constant	To avoid noise	Asked participants	Reliable
Education	Constant	No training necessary to ensure familiarity with study object	Participants with sufficient knowledge for study object	Comparable knowledge
Programming experience	Constant	To avoid noise	Questionnaire	Reliable
Reading time	Ignored	Negligible influence		
Individual circumstances				
Attitude toward study object	Ignored	Negligible influence due to small tasks		
Familiarity with study object	Constant	No training necessary to ensure familiarity	Participants of similar programming experience and Java experience	Have same familiarity
Familiarity with tools	Ignored	Negligible influence		
Fatigue	Avoided	Reduce stress for participants	Short session duration	Humans get restless after 60 minutes
Motivation	Analyzed afterwards	Can change during experiment	Questionnaire	Reliable
Treatment preference	Ignored	Only one treatment condition		

Table 1: Individual confounding parameters.

Parameter	Control technique		Measured/Ensured	
	How?	Why?	How?	Why?
Subject related				
Evaluation apprehension	Avoided	To get actual performance	Anonymized data	Performance not biased
Hawthorne effect	Avoided	Reliable	Not revealed hypotheses	Performance not biased
Process conformance	Analyzed afterwards	To reduce motion artifacts while in scanner	Reminded participants to follow instructions	Ensure process conformance
Study-object coverage	Did not occur, all participants completed all tasks			
Ties to persistent memory	Ignored	Negligible influence		
Time pressure	Not controlled	Technical time constraints to reliably measure BOLD effect		
Visual effort	Constant	Code fragments of comparable size	Lines of code	Accurate enough metric
Technical				
Data consistency	Avoided	Reliable	Double checked data	Reliable
Instrumentation	Avoided	Reliable	Pilot study	Assure suitable instruments
Mono-method bias	Avoided	Reliable	BOLD effect, correctness	Suitable indicators
Mono-operation bias	Avoided	Reliable	Different tasks	Reliable
Technical problems	Avoided	Reliable	Pilot studies	Detect problems in time
Context related				
Learning effects	Avoided	Reliable	Large distance between corresponding comprehension and syntax tasks	Learning should not occur
Mortality	Avoided	Reliable	One session	No drop outs
Operationalization of study object	Avoided	Reliable	Suitable based on literature and pilot studies	Learned from others
Ordering	Constant	Reliable	Same order of tasks	Same for all participants
Rosenthal	Avoided	Reliable	Standardized instructions	Reliable
Selection	Accepted	No according resources	Interpretation restricted to selected sample	
Study-object related				
Content of study object	Constant	Reliable	Same source code	Reliable
Language	Constant	Reliable	Languages participants knew	No training necessary
Layout of study object	Constant	Reliable	Same layout	Reliable
Size of study object	Constant	Reliable	Same size	Reliable
Tasks	Constant	Reliable	Same tasks	Reliable

Table 2: Experimental confounding parameters.