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Supplemental Information: Global sensitivity analysis of a dynamic model for gene expression in *Drosophila* embryos

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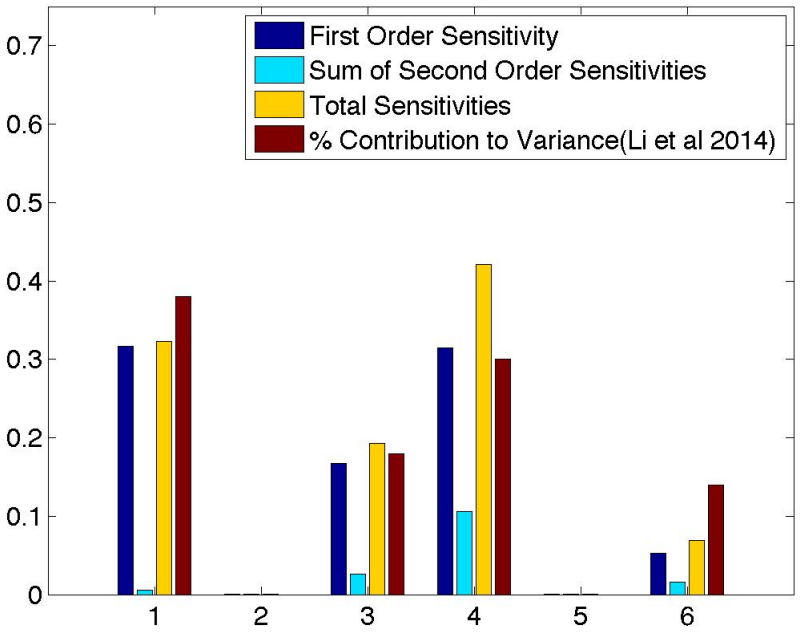
A.



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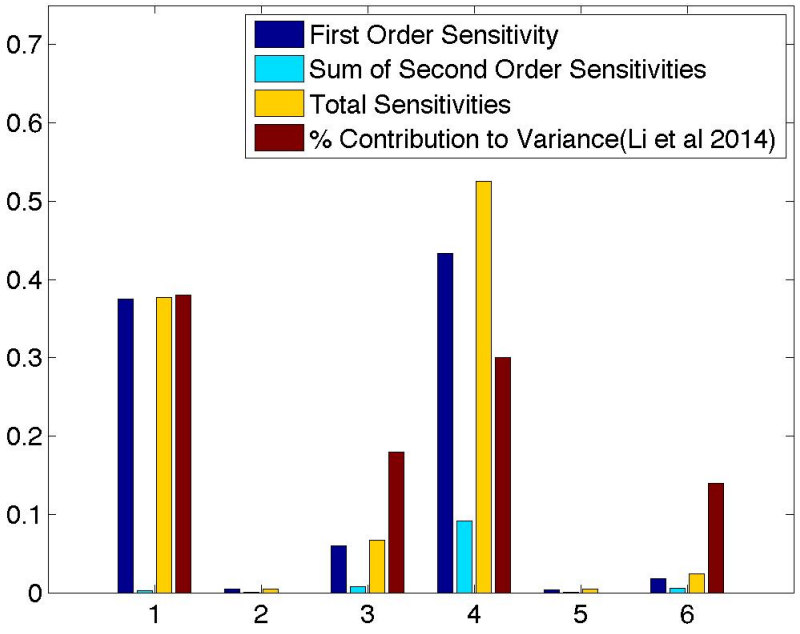
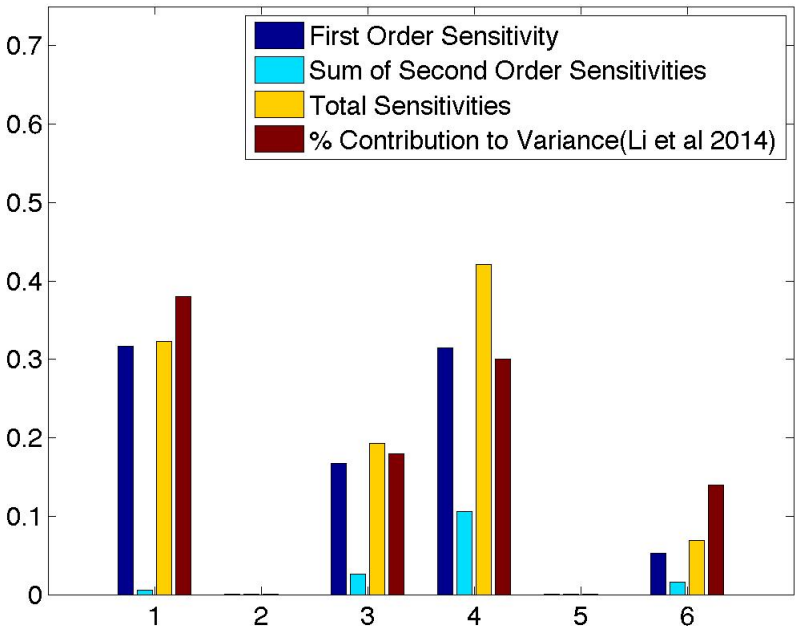


Fig. S1. Qualitative similarities between parameter sensitivities at the most anterior nucleus and experimental measurements. A. Ubiquitous gene with initial concentrations of 1.0; First and second-order sensitivities at the most anterior nucleus at $t = 4$ minutes. B. Anterior maternally deposited gene; First and second-order sensitivities at the most anterior nucleus at $t = 2$ minutes. In both panels, along the x-axis are the parameters corresponding to: 1. Transcription, 2. mRNA Diffusion, 3. mRNA Decay, 4. Translation, 5. Protein Diffusion, and 6. Protein Decay.

A.



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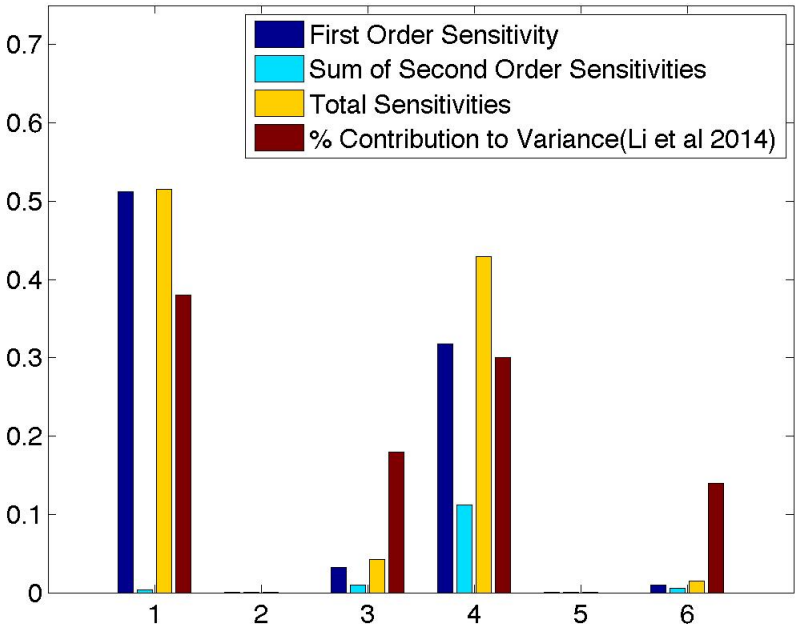

Fig. S2. Qualitative similarities between parameter sensitivities at the most posterior nucleus and experimental measurements. A. Ubiquitous gene with initial concentrations of 1.0; First and second-order sensitivities at the most posterior nucleus at $t = 4$ minutes. B. Anterior maternally deposited gene; First and second-order sensitivities at the most posterior nucleus at $t = 2$ minutes. In both panels, along the x-axis are the parameters corresponding to: 1. Transcription, 2. mRNA Diffusion, 3. mRNA Decay, 4. Translation, 5. Protein Diffusion, and 6. Protein Decay.

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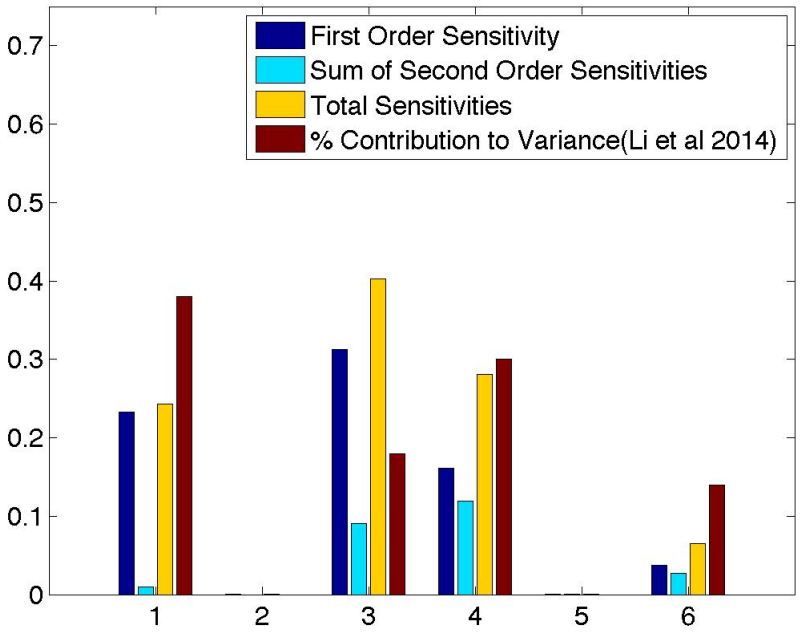

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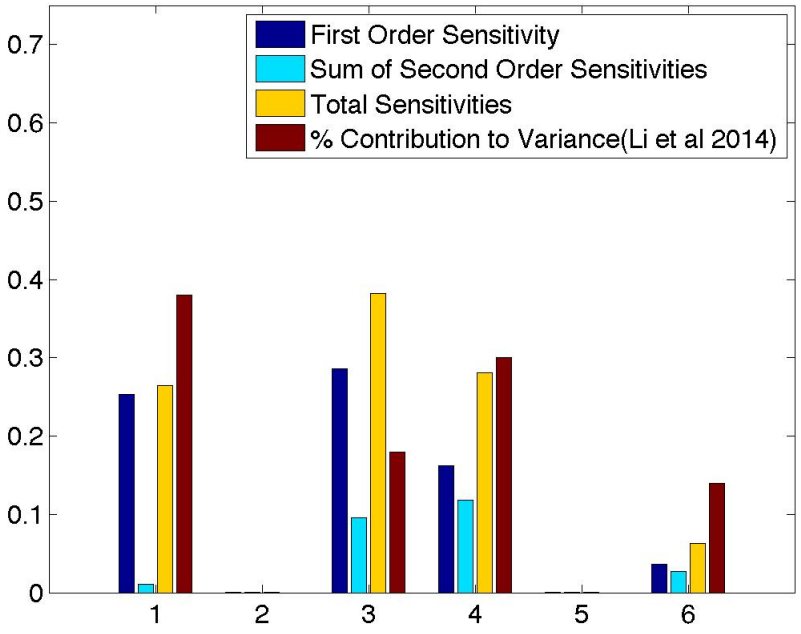
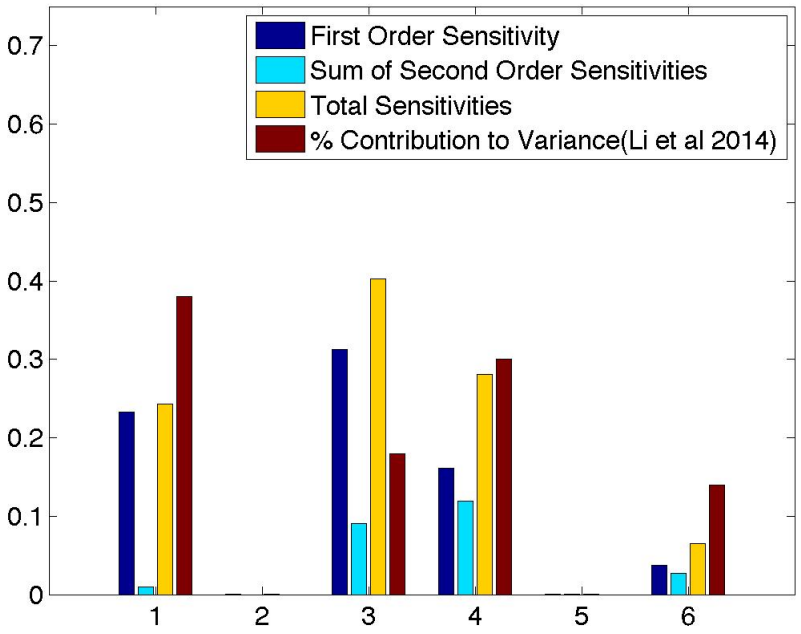


Fig. S3. Comparison of parameter sensitivities at the most anterior nucleus to experimental measurements at a later time point. A. Ubiquitous gene with initial concentrations of 1.0; First and second-order sensitivities at the most anterior nucleus at $t = 10$ minutes. B. Anterior maternally deposited gene; First and second-order sensitivities at the most anterior nucleus at $t = 10$ minutes. In both panels, along the x-axis are the parameters corresponding to: 1. Transcription, 2. mRNA Diffusion, 3. mRNA Decay, 4. Translation, 5. Protein Diffusion, and 6. Protein Decay.

A.



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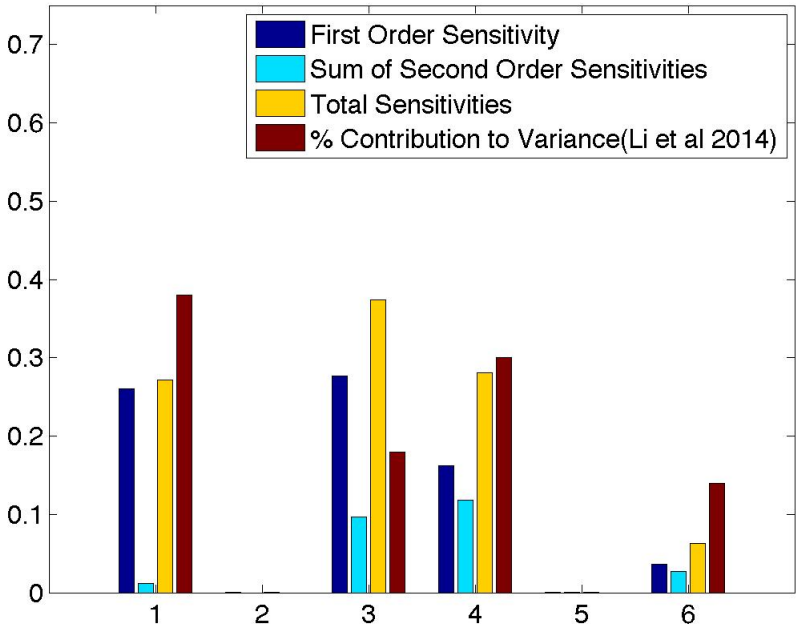
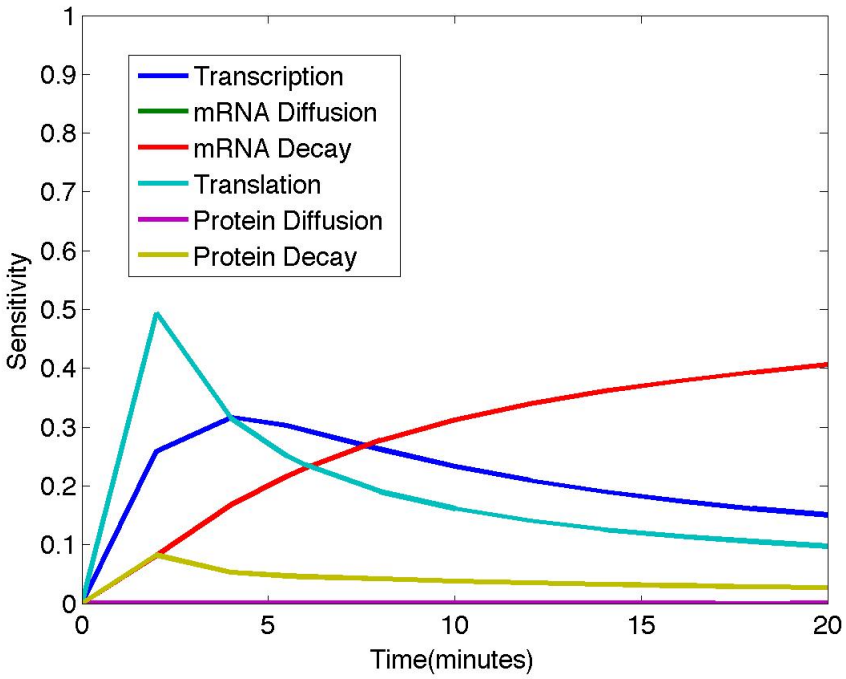


Fig. S4. Comparison of parameter sensitivities at the most posterior nucleus to experimental measurements at a later time point. A. Ubiquitous gene with initial concentrations of 1.0; First and second-order sensitivities at the most posterior nucleus at $t = 10$ minutes. B. Anterior maternally deposited gene; First and second-order sensitivities at the most posterior nucleus at $t = 10$ minutes. In both panels, along the x-axis are the parameters corresponding to: 1. Transcription, 2. mRNA Diffusion, 3. mRNA Decay, 4. Translation, 5. Protein Diffusion, and 6. Protein Decay.

A.



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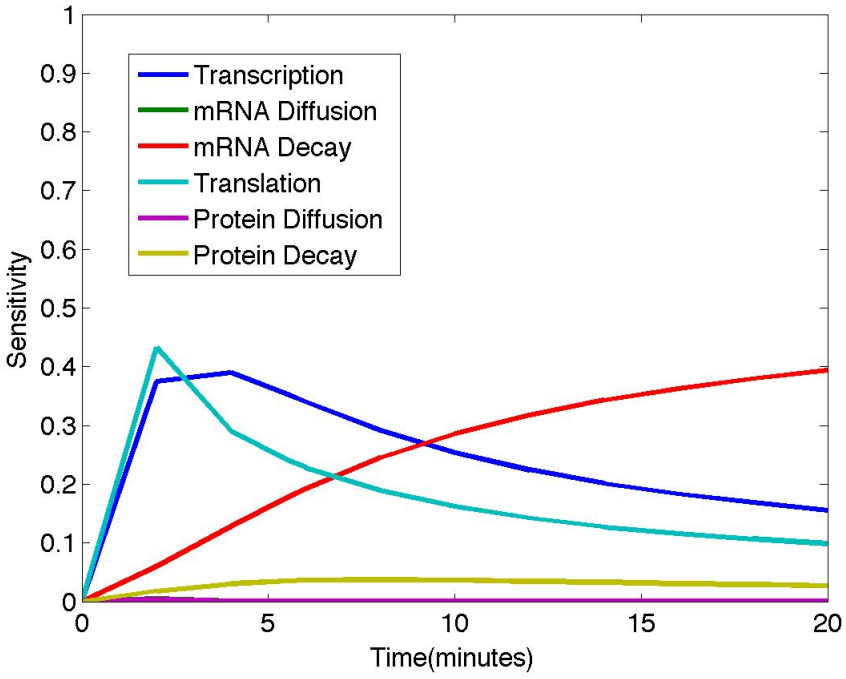
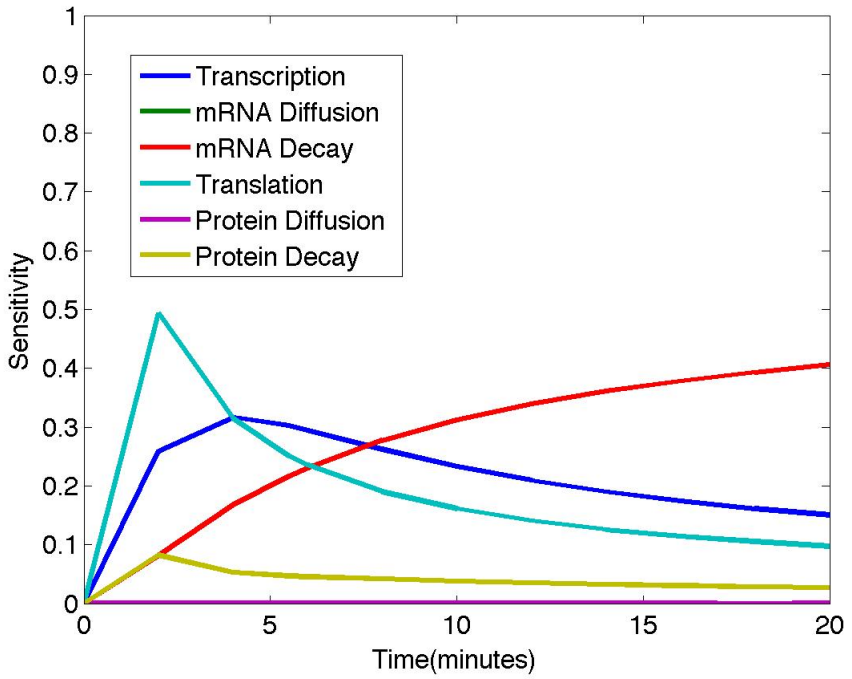


Fig. S5. Temporal dynamics of parameter sensitivities at the most anterior nucleus. A. First-order parameter sensitivities at the most anterior nucleus over time for a ubiquitous gene with initial concentrations of 1.0. B. First-order parameter sensitivities at the most anterior nucleus over time for an anterior maternally deposited gene

A.



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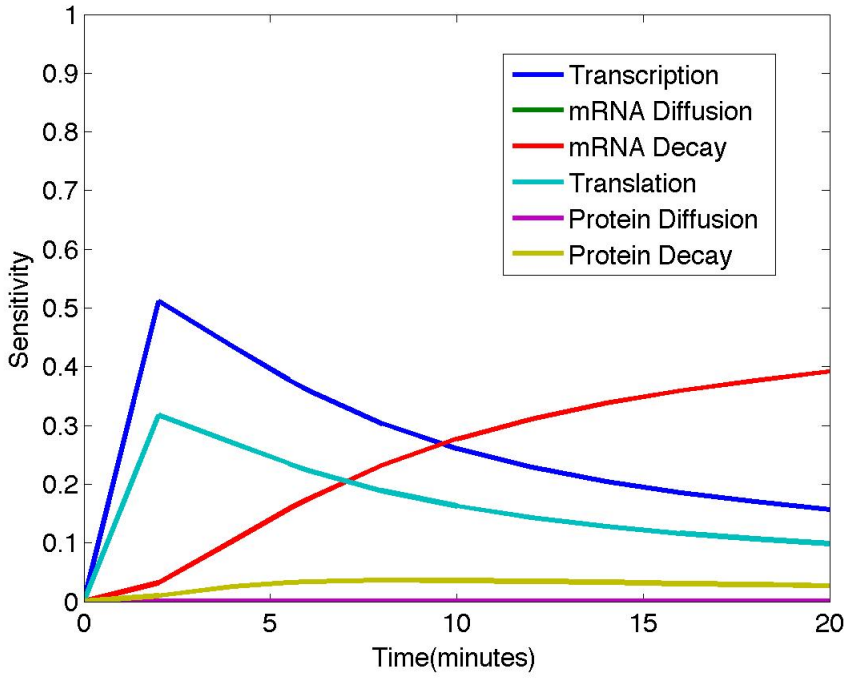

Fig. S6. Temporal dynamics of parameter sensitivities at the most posterior nucleus. A. First-order parameter sensitivities at the most posterior nucleus over time for a ubiquitous gene with initial concentrations of 1.0. B. First-order parameter sensitivities at the most posterior nucleus over time for an anterior maternally deposited gene