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Social context impacts inhibitory control

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Inhibitory control is a core executive function for goal-directed behavior and anomalous inhibitory control is associated with drug abuse and addiction. Inhibitory capacity is not uniform in all individuals nor under all circumstances but is affected by genetic and environmental interplay; however, the underlying mechanism remains poorly understood. We found that social context interacts with dopamine activity to impact inhibitory control in *Drosophila*. We developed a fly version of the go/no-go test to measure action restraint. Wild-type flies sustained movement suppression but the flies with enhanced dopamine neurotransmission lost inhibition and exhibited impulsive movements in the presence of peers. The social context-sensitive impulsivity requires the mushroom body D1 dopamine receptor and cAMP signaling. Strikingly, mushroom body activation is sufficient to provoke impulsivity without dopamine input nor social context. We further delineated the dopamine neurons providing input to the mushroom body as well as output neurons conveying the social information, which serve as baseline to uncover the underlying cellular and molecular mechanisms via unbiased genetic approaches. Our study underscores the impact of social environment in task performance, which is largely overlooked in most studies on human subjects, and provides a unique opportunity for mechanistic study of social and genetic influence on inhibitory control.