# Unified Theories of Cognition: Newell's Vision after 25 Years

**Glenn Gunzelmann (glenn.gunzelmann@us.af.mil)**
C g i i e M de & Age B a ch, Ai F ce Re ea ch Lab a
711 HPW/RHAC, 2620 Q S ., B i di g 852
W igh Pa e Ai F ce Ba e, OH 85212-6061 USA

## Introduction

I ha bee 25 ea i ce U ified The ie f C g i i a b i hed (Ne e , 1990). I i, Ne e i e a i i i ie ge e a i f c g i i e cie i a d c g i i e de e ; a e f he ie ha ide c ehe i e acc f he h a i d. A he i:

> "A single system (mind) produces all aspects of beha i . I i e i d ha i d he a . E e if he i d ha a , d e, c e , ha e e, they all mesh together to produce behavior… If a he c e e a c e , i f i i h b e f he a . I g e i h a i g ha he e a e di cia i , i e de e de cie , i e e abi i ie , and modularities… But they don't remove the necessity f a he ha ide he a ic e a d e ai the role of the parts and why they exist." (Newell, 1990, . 17-18).

The i e e i g ea ha e d ced a ea h f e ea ch g e a f . O e i a ea e i he be f ca dida e he ie ha ha e e e ged. I hi b , Ne e e ici i ed he eed f i e ified he ie f c g i i d i e g e h gh de c a i . The 1990's and early 2000's saw a large e a i i he ie idi g b ad acc f h a c g i i e ca aci ie ( ee, e.g., G c & Pe , 2005). I

c i add e e hi cha e ge da . I ead, ified he ie a e ed i c ea i g e ai i a ed he e a a d a ida e ic - he ie . F c g i i e a chi ec e e ai e e a i he f e f c g i i e science, the community must take seriously Newell's vision, a d ef c he cha e ge f de e i g a he ha e ai he e f he a i c e , h he e i , a d h he a e i eg a ed c ea e he h a i d.

**Paul Rosenbloom**

Newell's call for integrated approaches to cognition is as e e a a e e , b b ad g e e he a 25 ea i b h he a a a d a ificia cie ce e ab e , a d e e de a d , e be e e e a bi i da he hi i g ab i eg a i . Ca e b i d i g e e ha a f he bi gica ba d, h gh he c g i i e a d a i a ba d , he cia ba d? Ca e c e e he ce i g a h f e ce i a d a e i , h gh c g i i a d affec , c i h a bi a b da ie be ee he e a ? A d ca i eg a ed a ache i f ab b h a a a d a ificia c g i i ? I i di c h a a e a e ch e i , a d i a e ie di g ha c d be ca ed a *grand unification*, ha d i e he de e e f he Sig a c g i i e a chi ec e a d e (R e b , 2013).

**Dario Salvucci**

Newell's vision for unified theories of cognition has no d b d a he ce e iece f c g i i e-a chi ec e e ea ch i ce hi e i a "20 Q e i " a e (Ne e , 1973). I hi a e , Ne e ed h ee c e e a ac i i ie i hi eff : he e f "c e e ce i g de ," e e ified b d c i e ; he a a i f c e a , be d h e i ed i i e ch gica a adig ; a d he de e e f " e g a f a a ," a i g e de ha ac i a a ie f a d ai . A g ab he c g i i e-a chi ec e c i ha f c ed a ge he fi a d ec d ac i i ie , hi e he hi d ac i i ha ecei ed ch e a e i . I i di c e ece eff (e.g., Sa cci, 2013) ha ai e e d he ca abi i ie f c g i i e a chi ec e i hi hi d di ec i .

**Iris van Rooij**

Ne f a a d c ce a f he i i g ab c g i i ha e de e ed i ce Ne e iced hi c ce about experimental psychology in his seminal "20 questions" paper, and proposed specific ways of dealing i h he . U i g he e e e ca ca he e ica e e e ide ha Ne e e ha e i i ed. F i a ce, i a ad a ce ha e bee ade i he i i g ab c g i i a a e e *above* ha f echa i , i ., ha Marr (1982) called the 'computational level' (a d A de (1990) ca the 'rational level'). I i di c h he i i g a hi e e a be ef f add e i g a cha e ge ha e ai hi da : H a e de ha ca ca e be d ecific e e i e a a a d e ai c g i i i i f d ai ge e a i ?

**Marieke van Vugt**

A a e a i e ide , i c e ha he ad i f