

Index

- Add Health data set, 266–267
- addiction, and animal models, 337–339. *See also* reinforcement
- Adolescent Alcohol Prevention Trials (AAPT), 256–257, 266–267
- adolescents and adolescence.
See development; *specific topics*
- age of onset: and approaches to prevention, 119–124; and basic model of progression, 70–73, 208–209, 213, 217–222, 226; and development trajectories, 29–38; and historical variations, 105–109; measures of, 24–25; as predictor of abuse and dependence, 22; and progression, 78–79, 82–84; and sequencing, 26–29. *See also* birth cohorts; children; initiation
- aggression, and initiation of drug use in adolescents, 175–176
- alcohol and alcohol abuse: and age of first use as predictor of drug abuse and dependence, 22, 24, 26–29; and attentional processes, 299, 300; and basic model of progression, 70–73; and behavioral features of progression, 78–87; and caffeine use as risk factor, 255; and cross-sensitization, 325; and diagnostic criteria for dependence, 25–26; and feeding behaviors in animal models, 298; and GABA neurons, 320–321; and gender differences in sequences of progression, 73–76, 199–204, 214–216; and growth curve modeling of progression, 232–240, 241–245, 246–248; interaction with early concurrent use of cigarettes, 300–301; latent transition analysis of progression, 256–268; and life skills training approach to prevention, 125–126, 128, 129–130; and locomotion in animal, 305–306; and measure of use intensity, 25; and multicomunity-based prevention program, 153; and parametric event sequence analysis, 206–211, 218–222; predictors of initiation of use in adolescents, 168–169; and prevention studies, 120, 162–164; and progression to hard drug use in inner-city New York, 98–110; race and patterns of progression, 204–206, 214–216; reasons for experimentation with, 291, 292; and reinforcement, 348; and relapse, 349; and sequence of progression, 20–21, 225–226; and social norms of acceptability and

- alcohol and alcohol abuse (*cont.*)
 harm, 42–43, 44, 46–63; and stress in animal models, 301; and substance-specific progression, 117–118; substitutability and progression, 190–191, 196; and transition diagrams, 97–98; and use trajectory as predictor of abuse or dependence, 32, 33–38
- American Psychiatric Association.
See DSM-IV
- amphetamines: and cross-sensitization in animal models, 324; and multicomunity-based prevention program, 145, 148, 150–154; and reinforcement, 340, 342; stress and self-administration of in animal models, 303
- animal models: and contributions to study of drug abuse, 289–290; and neurobiology of addiction, 337–352; potential of for examination of Gateway Hypothesis, 294–308; and research on prevention, 293–294, 308; and research on progression, 8; and studies of behavior, health, and drug use, 292–293
- antisocial behavior, and initiation of drug use in adolescents, 164–165, 167, 168, 170, 172–173, 176–177
- Anzalone, D., 224
- appetitive behaviors, and animal models of drug abuse, 297–299
- Arrestee Drug Abuse Monitoring Program (ADAM), 94–97, 100, 101*f*, 102, 103, 105, 106
- Ary, D. V., 162
- assertiveness, and life skills training program, 130–132, 133, 134
- association: and causality, 4, 283–284, 366, 370–371; conceptual distinction between sequencing and, 4, 66–67, 187–191, 213–216, 276; of lifetime use between alcohol and marijuana, 76; log linear models and strength of, 69; and parametric event sequence analysis of progression, 206–211, 217–222; and parsing of Gateway Hypothesis, 369; and stages of progression, 188, 270, 274–277; and substitutability of substances in initiation of drug use, 190–191; use of term, 4
- attentional effects, and animal models of drug use, 299–301
- attention deficit hyperactivity disorder (ADHD), 299
- barbiturates, and reinforcement, 343
- Barnes, G. M., 6
- Bates, M. E., 22
- Bayesian information criteria (BIC), 198, 218
- behavior: animal models and studies of health, drug use, and, 292–293; and features of drug histories associated with progression, 78–87; psychostimulants and sensitization, 321. *See also* aggression; antisocial behavior; appetitive behaviors; delinquency
- Bentler, P. M., 224, 235, 270, 271–272, 272–273, 274, 275, 276, 281, 284
- benzodiazepines, and reinforcement, 343
- Biglan, A., 160–161, 162
- biological factors: and animal models of drug use and abuse, 292–293, 295; and marijuana as gateway for cocaine, 265. *See also* neurobiology
- biopsychosocial views, of drug use sequences, 223
- birth cohorts: and differences in sequences of drug use, 367; and parametric event sequence analysis of progression, 213; and progression to hard drug use in inner-city New York, 102–105, 107*t*. *See also* age of onset
- Black, C., 162
- body weight, and animal models for appetitive behaviors, 297–299
- bonding, to mother and social norms of substance use, 53, 62
- Brown, B. B., 90

Cambridge University Press

0521783496 - Stages and Pathways of Drug Involvement: Examining the Gateway Hypothesis

Edited by Denise B. Kandel

Index

[More information](#)*Index*

375

- caffeine: as risk factor for alcohol use, 255; and sensitization in animal models, 325–326
- California, and study of alcohol use in adolescents, 257
- cannabinoids, and dopamine, 321.
See also marijuana; THC
- catecholamine, and response to stress, 303
- causation and causality: and current limitations on establishment of, 283–284; as fundamental issue in research on Gateway Hypothesis, 8–9, 290–292, 359–371; use of term, 4
- Chen, K., 21, 224, 225
- children: and self-report studies, 289, 292; and social norms of substance use, 45–46. *See also* age of onset
- China, and tobacco use, 227
- Chou, S. P., 22
- cigarettes: and age of first use as predictor of drug abuse or dependence, 26–29; appetitive behaviors and body weight, 297–299; and basic model of progression, 70–73; and behavioral features of progression, 78–87; and behavioral influences on use of, 160–164; and gender differences in sequences of progression, 73–76, 199–204, 214–216; growth curve modeling and role of in drug use progression, 232–246; and latent transition analysis of initiation, 257–268; and life skills training approach to prevention, 125, 126–127, 128, 129–130; and multicomunity-based prevention program, 153; and parametric event sequence analysis, 206–211, 218–222; and predictors of initiation, 164–170; and progression to hard drug use in inner-city New York, 98–110; race and patterns of progression, 204–206, 214–216; reasons for initiation of, 290, 291, 292; and sequential model of drug use progression, 20–21, 224–227; and social norms of acceptability and harm, 42–43, 44, 46–63; and stress, 301–304; and studies of prevention, 120; and substance-specific progression, 117–118; substitutability and progression, 190–191, 196; and transition diagrams, 97–98; and use trajectory as predictor of drug abuse or dependence, 32, 33–38. *See also* nicotine and nicotine dependence
- Cliff, N., 271
- Clogg, C. C., 279
- CNS depressants, and attentional processes, 300
- cocaine: and attentional processes, 301; and basic model of progression, 70–73; and behavioral features of progression, 78–87; and cross-sensitization, 323, 325, 326; and daily use, 94; and dopamine levels, 321; and gender differences in sequences of progression, 73–76, 199–204, 214–216; and latent transition analysis of progression, 257–268; marijuana use and initiation of, 67; and parametric event sequence analysis, 206–213, 218–222; and progression to hard drug use in inner-city New York, 109; race and patterns of progression, 204–206, 214–216; and reinforcement, 340, 345, 348, 350, 351; and relapse, 349; and reward thresholds, 346f; self-administration and social interactions in animal models, 304; and sensitization, 327–328, 328–330; and studies of order of progression, 6
- coercive interactions, and behavioral influences on problem behavior in adolescents, 175
- Collins, L. M., 7, 227, 246, 254, 255, 258, 260, 270, 271, 272, 273, 274, 276, 277–280, 281–282, 283
- communication, and life skills training program, 123
- comparative fit index (CFI), 235
- conflict, and parental influences on problem behavior in children, 171

- contextualism, and behavioral influences
 on smoking and problem behavior in
 adolescents, 158, 165, 176, 178
- contingency table model, and latent
 transition analysis, 267
- coping skills, and life skills training
 program, 123
- Cornell University Medical College,
 122, 124
- corticosterone, and response to
 stress, 303
- corticotropin-releasing factor (CRF)
 function, and reinforcement, 347–348
- craving, and neurobiological substrates,
 348–349
- cross-lagged autoregressive models,
 and role of cigarettes in drug use
 progression, 228, 235–237, 241–242
- cross-sectional studies, and evidence
 for Gateway Hypothesis, 5
- cross-sensitization, and animal models,
 323–325
- cross-validation study, of role of
 cigarettes in drug use progression,
 240–249
- culture: and behavioral features of
 progression, 87; and determination of
 gateway order of substances, 92, 265,
 370. *See also* social context;
 social norms
- cyclic aminophosphate response-element
 binding protein (CREB), 348
- Dawson, D. A., 22
- decision making, and life skills training
 program, 123
- de Leeuw, J., 279
- delinquency: and behavioral influences
 on initiation of drug use, 177; and
 developmental sequences of drug
 use, 367
- Dent, V. W., 271
- dependence: predicted by use
 trajectories, 29–35; and stage of
 drug use, 80–82
- development: and drug involvement,
 68–78; and life skills training program,
 130–134; and perspectives on
 progression, 116–119, 226; and
 sequence proposition in Gateway
 Hypothesis, 367–368; and use
 trajectories based on age of onset
 and intensity, 29–35
- developmental trajectories, 19
- Dishion, T. J., 173–174
- Dolcini, M. D., 90
- Donaldson, S. I., 45
- Donovan, J. E., 7, 225, 271
- dopamine system: and caffeine, 326;
 and cannabinoids, 321; and
 reinforcement, 340, 342–344, 352;
 and self-administration of drugs in
 animal models, 303, 321; and theory of
 genetic variations and drug use
 sequences, 223
- drug abuse: definition of, 319; measures
 of, 25–26; pharmacological
 characteristics of, 320–321; and
 sensitization, 321. *See also specific
 substances*
- drug dependence: measures of, 25–26;
 and reinforcement, 338–339; and
 stages of drug use, 80–82
- drug discrimination, and animal
 models, 306
- drug-related information and skills,
 123–124
- Drug Use Forecasting (DUF) Program.
See Arrestee Drug Abuse Monitoring
 Program
- DSM-IV (American Psychiatric
 Association, 1994), and diagnostic
 criteria for drug abuse and drug
 dependence, 25, 68
- Duncan, S. C., 173, 240, 244, 245, 246
- Duncan, T. E., 162, 173, 175, 240,
 244, 245, 246
- DuPont, R., 3
- dysphoria, and withdrawal, 352
- Eccles, J. S., 91
- economic factors, and operant
 conditioning paradigms in animal
 models, 294

- Ellickson, P. L., 225, 227
- emotions, withdrawal and negative, 345
- ethanol, and animal models: and attentional processes, 300–301; and cross-sensitization, 324; and reinforcement, 343–344, 350; and reward thresholds, 346*f*; and stress, 303
- ethics, and research on drug use in children, 291
- ethnicity: and differences in sequences of progression, 76–78, 215; and initiation of alcohol and tobacco use, 55, 56, 59; and log linear analysis of progression, 204–206. *See also* race
- etiology, of drug use: and association, 369; and causation, 370
- extended amygdala, and reinforcement, 340, 349–351
- face valid animal models, 295–297
- family: and behavioral influences on adolescent smoking, 165; and initiation of tobacco use, 59; management practices and initiation of alcohol and marijuana use, 62; as protective factor for progression, 54–62; and social influences on drug use, 121. *See also* parents and parenting
- Family Environment Scale, 165
- Faraday, M. M., 306
- Faust, R., 225, 271
- feeding behaviors, and alcohol, 298
- Fendrich, M., 91
- fentanyl, and animal models of self-administration, 296, 302, 304
- Flaherty, B. P., 227, 246
- Fleming, R., 224
- follow-up study, of life skills training program, 129–130
- forward telescoping, 98
- fos-related antigens (FRAs), 348
- frequency, of drug use: and impact of national levels on the behavior of individual users, 83–87; and life skills training approach to prevention, 126–127; and progression, 79–80, 84, 117. *See also* intensity
- functional contextualism, and relations between behavior and environment, 159
- GABA (gamma-aminobutyric acid): and alcohol, 320–321; receptor complexes and reinforcement, 341*f*, 343
- Gateway drug: caffeine as, 325–326; concept and definition of, 7–8; “hard” drugs as, 328–330; methylphenidate as, 326–328; use of term, 3
- Gateway Hypothesis: and animal models for neurobiology of addiction, 337–352; and animal models for sensitization, 318–330; and association proposition, 4, 283–284, 366, 369; causation and causal proposition, 8, 366, 369–371; cigarette use and growth curve modeling for analysis of progression, 223–249; and component propositions, 365–367; concepts and measurement of stages of progression, 270–284; criticisms of, 224–227; development of concept, 3–7; fundamental issues in research on, 7–10; future of research on, 371–372; gender and race differences in progression, 187–222; intervention efforts and influences on development of problem behavior, 158–179; and latent transition analysis, 254–268; parsing of, 365–367; prevention of onset and progression of drug use in adolescents, 115–135; prevention programs and applications of, 139–154; progression and hard drug use in New York City, 90–110; and sequence proposition, 367–368; and sequencing, age of onset, and use trajectories as predictors of future drug abuse, 19–38; social norms and transitions in substance use, 42–63; and stages of drug involvement, 65–87, 118–119; and validity criteria, 4; and value of animal models, 289–308

Cambridge University Press

0521783496 - Stages and Pathways of Drug Involvement: Examining the Gateway Hypothesis

Edited by Denise B. Kandel

Index

[More information](#)

378

Index

- gender: and animal models of drug effects, 295, 307; and behavioral influences on problem behavior in adolescents, 175; and growth curve models of role of cigarette smoking in drug use progression, 239, 241–245; and log linear models of progression, 199–204, 214–216; and parametric event sequence analysis of initiation, 208–209*t*, 211, 213, 217–222; and progression to hard drug use in inner-city New York, 107*t*; and risk of marijuana initiation, 59; and sequences of progression, 73–76; and stress–drug self-administration relationship, 302
- genetic variations: drug use sequences and theory of, 223; genotype and animal model studies, 295, 306–307
- Goldstein, P. J., 91
- Golub, A., 10, 20–21, 65, 91, 92, 98
- Goodman, L. A., 271, 279, 280
- Graham, J. W., 45, 119, 260
- Grant, B. F., 22
- Griffin, A., 22
- growth curve modeling, and growth trajectory hypothesis for progression, 223, 227, 230–232
- Guttman scale: and analytic variations in progression, 226, 227; and cross-sectional studies, 5; and stages of progression, 271, 272, 280
- hallucinogens: and life skills training program, 130; and studies of order of progression, 6
- Hawkins, J. D., 22
- Hays, R. D., 6
- hazard rates: and association of stages of progression, 188, 276; and initiation of alcohol, tobacco, and marijuana, 54–55
- heroin: age at onset and progression, 78–79; and basic model of progression, 70–73; and cross-sensitization, 325; and ethnic differences in sequences of progression, 77; and gender differences in sequences of progression, 76, 199–204, 214–216; and life skills training program, 130; and parametric event sequence analysis, 206–213, 218–222; and progression to hard drug use in inner-city New York, 109; race and patterns of progression, 204–206, 214–216; and reinforcement, 342, 351; and sequence of drug involvement, 66, 67
- higher-use stage, 37–38
- historical variation, and first substance used, 102–109
- Hofer, S. M., 45
- Holland, S., 22
- Hyatt, S. L., 260
- hypervigilance, and alcohol use, 300
- Indianapolis, and multicomunity-based drug abuse prevention program, 143
- inhalants, and substance-specific progression, 117–118
- initiation, of drug use: measures of, 48*t*; and parametric event sequence analysis, 218–222; predictors of for adolescent smoking, 164–170; and prevention programs, 124–135; and quasi-independence model, 191–194; and reinforcement, 339; and sequence of drug use progression, 368; and survival analysis of alcohol, tobacco, and marijuana, 52–60. *See also* age of onset
- intensity, of drug use: and association, 369; and causality, 370; and developmental trajectories as predictors of drug abuse and dependence, 29–32, 36–37; measures of, 25, 28*t*. *See also* frequency
- interdomain behavior sequences, and drug use progression, 225
- intraindividual changes and differences, and quasi-independence model, 280
- intrapsychic factors, and marijuana as gateway for cocaine, 265

Cambridge University Press

0521783496 - Stages and Pathways of Drug Involvement: Examining the Gateway Hypothesis

Edited by Denise B. Kandel

Index

[More information](#)*Index*

379

- Jessor, R., 7, 11, 164, 176, 177, 225, 271
 Jessor, S. L., 164, 176, 177
 Johnson, B., 10, 20–21, 65, 91, 92, 98
- Kandel, D. B., 11, 21, 66, 69, 90, 118, 176, 188, 194, 224, 225, 254, 255, 271, 272, 273, 274–275, 276, 277–284
 Kansas City, and multicomunity-based drug abuse prevention program, 143
 Klein, L. C., 295–296
 knock-out mice, 307, 342
 Koob, G. F., 11, 297
- Labouvie, E., 22, 65, 98
 Langeheine, R., 279
 latent growth curve models, and analysis of cigarette smoking and drug use progression, 228–232, 237–240, 242–245
 Latent Growth Modeling, problem behavior and drug use in adolescents, 173
 latent Markov (LM) model, 279
 latent states: and latent transition analysis, 259, 262, 266; and mixed Markov latent class model, 277–279
 Latent Transition Analysis (LTA): and association of stages of progression, 274, 276, 281–282; and evidence for developmental progression, 119, 227; quasi-independence model compared to, 277–284; and study of alcohol initiation, 256–268; and study of social norms and transitions in substance use, 44, 46–52
 Leventhal, A., 90
 life event history analysis, and drug use progression, 226
 Life Skills Training (LST), 116, 122–135
 life style, and risk factors for drug use, 122
 linear growth curve model, and distinction between stages of progression and regression, 276
 locomotion, and animal models of drug effects, 305–306, 320, 322, 323–324
- log linear models: and identification of pathways of progression, 69, 191–222
- Mackesy-Amiti, M. E., 20, 91
 MacKinnon, D. P., 45
 manifest patterns, of drug use, 274
 marijuana: and age of first use as predictor of drug abuse or dependence, 26–29; and basic model of progression, 70–73; and behavioral features of progression, 78–87; and diagnostic criteria for drug dependence, 25–26; as gateway for cocaine, 265; and gender differences in sequences of progression, 73–76, 199–204, 214–216; and growth curve modeling of drug use progression, 241–245; and initiation of cocaine, 67, 265–266; and latent transition analysis of alcohol use, 257–268; and life skills training approach to prevention, 125–126, 128, 129–130; and multicomunity-based prevention program, 153; and parametric event sequence analysis, 206–213, 218–222; prevention programs and behavioral influences on use of, 162–164; and progression to hard drug use in inner-city New York, 98–110; race and patterns of progression, 204–206, 214–216; and sensitization, 322; and sequence of drug use progression, 20–21, 225–226; and social norms of acceptability and harm, 42–43, 44, 46–63; and studies of prevention, 120; and substance-specific progression, 117–118; substitutability and progression, 190–191, 196; and transition diagrams, 97–98; and use trajectory as predictor of drug abuse or dependence, 32, 33–38, 265. *See also* cannabinoids; THC
 measurement error, and stages of progression, 273–274, 278. *See also* noise; random errors
 mechanism, as framework for behavioral science research, 158

Cambridge University Press

0521783496 - Stages and Pathways of Drug Involvement: Examining the Gateway Hypothesis

Edited by Denise B. Kandel

Index

[More information](#)

380

Index

- media, and portrayals of drug use, 121, 122
- mediational relationship, amphetamine use and multicommunity-based prevention program, 150–154
- methodology: and estimation of mediational effects of prevention programs, 141–143; latent transition analysis and alcohol use, 256–260; parameter estimation and model selection for log linear analysis, 198; and quality of evidence for Gateway Hypothesis, 9. *See also* measurement error; regression analysis; selection bias
- methylphenidate, and sensitization, 326–328, 329*f*
- mixed Markov latent class (MMLC) model, 277–279
- Monitoring the Future* (Johnston, O'Malley, & Bachman, 1994), 46, 84–85, 129
- Moos, R. H., 165
- morphine, and animal models: and cross-sensitization, 324, 325; and reward thresholds, 346*f*; and stress, 302
- mothers. *See* bonding; parents and parenting
- Mover-random mixture model, 279
- mover-stayer model, 279
- multidisciplinary approaches, 308, 371–372
- multiple substances: and developmental progression of drug use, 117; and life skills training approach to prevention, 127, 129
- mu opioid receptor, and reinforcement, 342
- naloxone: and reward thresholds, 346*f*; and stress, 302
- naltrexone, and prevention of relapse in alcoholics, 349
- National Household Survey on Drug Abuse (NHSDA), 66, 67–68, 78, 80, 92–94, 95–96*t*, 99–100, 101*f*, 102, 105, 106, 108*t*, 199
- National School Lunch/School Breakfast Program, 44
- neurobiology, and animal models of addiction, 337–352
- neurochemistry, psychostimulants and sensitization, 321. *See also* dopamine system
- neurophysiology, and developmental progressions in drug use, 87
- Newcomb, M. D., 224, 225, 270, 272–273
- Newton-Raphson algorithm, 198
- New York, progression and hard drug use in inner-city, 92–110
- nicotine and nicotine dependence: addiction and behavioral effects of, 291; animal models and studies of, 296, 299–301, 305–306, 307, 320, 322, 323; and behavioral features of drug histories associated with progression, 80–82; nicotinic receptors and reinforcement, 341*f*, 344. *See also* cigarettes
- NMDA (N-methyl-D-aspartate) receptor, and reinforcement, 343–344
- noise, and sequencing and association in initiation of drug use, 189, 214
- norms, and transitions, 42–63
- Nurmi, J. E., 91
- one-directional drug acquisition model, of drug use progression, 248
- onset sequence, and concept of stage of drug use, 37–38
- operant conditioning paradigms, and economic factors in drug initiation and maintenance, 294
- opiates, and animal models: of reinforcement, 342–343, 348, 350; of self-administration, 296, 298, 299, 300, 303, 304, 305–306
- opioid antagonists: and reinforcement, 343; and relapse, 349
- opioid peptide-containing neurons, and reinforcement, 341*f*
- oppositional behavior, and initiation of drug use in adolescents, 176–177
- ordering, and increased risk of progression, 25

Cambridge University Press

0521783496 - Stages and Pathways of Drug Involvement: Examining the Gateway Hypothesis

Edited by Denise B. Kandel

Index

[More information](#)

Index

381

- Oregon Social Learning Center (OSLC), 175
- organicism, and behavioral science research, 159
- Pandina, R. J., 22
- parametric event sequence analysis: and modeling of sequencing and association, 194–198, 214, 217–222; and patterns of progression, 206–213; and quasi-independence model, 282–284
- parents and parenting: and antisocial behavior, 167; and behavioral influences on adolescent drug use and problem behavior, 166, 169, 171, 173–177; and growth curve modeling of cigarette use and progression, 241–245; and social norms of substance use, 53, 61, 62–63. *See also* bonding; family
- pathways: definition of in context of progression, 189; of drug involvement, 69, 72*f*, 187–191. *See also* progression; sequencing; systematic pathways
- Patterson, G. R., 173–174, 177
- Pedersen, W., 22, 36
- peers: and behavioral influences on drug use and problem behavior, 160, 165, 169–170, 171, 173–177; and growth curve models of role of cigarettes in drug use progression, 242–245; and social norms of substance use, 53, 62–63, 121. *See also* social context
- personal self-management skills, and life skills training program, 123
- personal vulnerabilities, and growth curve models of drug use progression, 248. *See also* psychological characteristics and variables
- pharmacology: and animal model studies, 295; and characteristics of drug abuse, 320–321. *See also* psychotropic drugs; sedative-hypnotic drugs; *specific drugs*
- Pickering, R. P., 22
- pituitary adrenal function, and reinforcement, 347
- policy, and implications of research on Gateway Hypothesis, 9–10
- Popke, E. J., 301
- Poulsen, C. S., 279
- predictive verification, and behavioral science research, 158
- predictors and prediction: ages of onset and sequencing as, 26–29; and developmental trajectories based on age of onset and intensity, 29–38; growth curve modeling and role of cigarettes in drug use progression, 236–237, 239, 244; and influence of behavior, 159; and influences on drug use sequences, 227; of initiation of smoking in adolescents, 164–170
- prevention programs: animal models and research on, 293–294, 308; approaches for, 119–124; and association, 369; and behavioral influences on initiation of drug use, 161–164, 178–179; effectiveness of school-based, 115, 120–121, 178–179; effects of on transitions, 130–134; and initiation in early adolescence, 83–84; initiation and escalation of drug use, 124–135; and life skills training, 116, 122–135; and methodological questions on application of Gateway Hypothesis, 141–143; and multicomunity-based program, 143–154; and patterns of developmental progression, 118; research on development of effective, 115–116; social norms and school-based, 61; and tests of Gateway Hypothesis, 8; and theoretical questions on application of Gateway hypothesis, 139–141; and various drug use outcomes, 125–130
- problem solving, and life skills training program, 123
- progression, in drug use: alcohol, cigarettes, and marijuana in sequence of, 20–21, 98–102, 214–215; and animal models of sensitization, 319–330; and approaches for prevention, 119–135; behavioral

- progression, in drug use (*cont.*)
 features of drug histories associated with, 78–87; comparison of various models of, 277–284; conditions for substantiation of stages of, 187–191, 270–271; ethnic differences in, 55, 56, 59, 76–78, 204–206, 215–216; and evidence for developmental sequence, 119; as fundamental issue in research on Gateway Hypothesis, 8–9; gender differences in, 55, 56, 59, 73–76, 199–204, 215; growth curve modeling and context and predictors of, 227; identification of models of, 68–73; inevitability of, 21; models of, 68–73, 191–222; as multidimensional process, 116–118; quasi-independence model and latent transition analysis compared, 277–284; and regression, 276; and sensitization, 322–325, 328–330; and sequences of hard drug use in New York City, 92–110; and sequence proposition in Gateway Hypothesis, 367–368; and stage sequence from licit drugs to marijuana, 206–211; and stage sequence from marijuana to cocaine or heroin, 211–213; and stage sequence for specific substances, 118; variations in concepts and measurement of stages of, 271–277. *See also* sequencing; stage Project SixTeen, 161–170
- protective factors: and academic orientation, 234, 236–238; and bonding to mother, 53–62; and parental support, 234, 236–238; and proactive family management, 53–62; and variation in drug use, 371, 372
- psychological characteristics and variables: and animal models, 294–295; and risk factors for drug use, 122; and role of cigarettes in drug use progression, 234, 236–237, 239, 248; and stress–drug relationship in animal models, 302
- psychostimulants: and hyperlocomotion, 320; and reinforcement, 340, 342; and sensitization, 321
- psychotropic drugs, and drug progression sequence, 368
- quasi-independence model: and association of stages of progression, 274–275; and identification of pathways of progression, 69, 191–198; and latent transition analysis, 277–284; and methods of parameter estimation, 198; and parametric event sequence analysis, 282–284
- race: and differences in sequences of progression, 76–78, 367; and initiation of marijuana use, 59; and life skills training approach to prevention, 126; and log linear analysis of progression, 204–206, 207*f*, 208–209*t*, 211, 213, 214–222; and progression to hard drug use in inner-city New York, 107*t*. *See also* ethnicity
- random errors: and concepts of sequencing and association in initiation of drug use, 189, 214; and latent transition analysis, 268. *See also* measurement error; noise
- reductionism, and research on adolescent problems in behavioral sciences, 178
- regression analysis: and association of stages of progression, 276; models of and study of multicomunity-based prevention program, 146–149, 150
- Reid, J. B., 173–174
- reinforcement: and drug dependence, 338–339; and neurobiological substrates, 345–348, 349–351; and neurological mechanisms, 340–344. *See also* addiction
- relapse, animal models of, 349, 351, 352
- risk factors: accumulation of multiple, 121; for adolescents versus adults, 26, 27*t*, 34–35; and antisocial behavior, 164–165, 167–168, 170; caffeine use and alcohol initiation, 255; and establishment of gateway sequence, 266; and friends' drug use, 234, 236–239, 248–249; and friends' smoking, 166–171; and inadequate

- monitoring or parenting, 165–171; and low family supportiveness, 165, 168–170; measures of, 26, 27*t*; and negative parent–child interactions, 165–171, 240–244; norms as, 52–54, 59–61; ordering as, 25; and peer encouragement of drug use, 240–244, 248–249; and prediction of drug abuse/dependence from use trajectories, 33–34, 36–37; and psychological distress, 234, 236–239, 248. *See also* age of onset; sensitization
- Robins, L., 84
- R–technique/T–technique factor analysis, 29–30
- Satorra, A., 235
- Schafer, J. L., 45
- Schenk, S., 297
- schools: academic failure and initiation of drug use, 172–173, 176–177, 236–237; effectiveness of prevention programs in, 115, 120–121, 178–179; social norms and prevention programs in, 61
- Seattle Social Development Project (SSDP), 43–44, 62
- sedative-hypnotic drugs, and reinforcement, 343
- selection bias, and limitations on establishment of causality, 283–284
- self-administration, and animal models for drug use and abuse, 292–293, 296–297, 300, 302, 321, 322, 324, 326
- self-report data: progression and hard drug use in inner-city New York, 97–98; and information on drug initiation and maintenance in children, 289, 292
- self-selection, and age at onset of drug initiation, 84
- sensation seeking traits, 318
- sensitization: and animal models of progression, 319–330; and involvement of extended amygdala, 350
- sensory gating, 299
- sequencing, of drug use: and association, 188–189, 213–216, 270; cigarette smoking and model of, 224–227; ethnic differences in, 76–78, 204–206; gender differences in, 73–76, 199–204; log linear models and differences in, 69, 191–198; and parametric event sequence analysis, 194–198, 206–211, 216–222; as predictor of drug abuse and drug dependence, 26–29; and progression, 20, 201–218, 270; and sequential order of initiation, 187–188. *See also* progression
- sexual behavior: and initiation of drug use in adolescents, 172–173, 176–177; sequencing and adolescent development, 367
- Single, E., 271
- Skrondal, A., 22, 36
- smoking. *See* cigarettes
- Smolkowski, K., 162
- social context: and animal models of drug use and abuse, 304–305; and approaches to prevention, 121, 122; and behavioral features of progression, 87; and behavioral influences on substance use initiation in adolescents, 170–179; and causality, 370–371; and developmental sequences of drug use, 367; and growth curve models of role of cigarettes in drug use progression, 240–249; and latent transition analysis, 265; and progression to hard drug use in inner-city New York, 109; and social influences on drug use, 160–179. *See also* culture; peers; social norms; social skills
- Social Development Model, 43
- social norms, and transitions in substance use from late childhood to late adolescence, 42–63. *See also* culture; social context
- social skills, and life skills training program, 123. *See also* peers; social context
- stage, and conditions for progression, 187–191

- Stepping-Stone Theory, 4
 stress, and animal models of drug
 self-administration, 296–297, 301–304
 structural equation modeling (SEM):
 and analysis of cigarette smoking and
 drug use progression, 228–232; and life
 skills training program, 130–132; and
 multicomunity-based prevention
 program, 149, 150
 Strycker, L. A., 173
 subcortical substantia innominata,
 and reinforcement, 349–350
 subsequent sequencing, and
 substitutability of substances in drug
 use initiation, 190
 Substance Abuse and Mental Health
 Services Administration (SAMHSA),
 67, 93, 199
 substance-specific progression, 117–118
 substitutability, and pathways of drug
 use progression, 190–191, 196, 214
 survival analysis, of alcohol, tobacco,
 and marijuana initiation, 52–60
 systematic pathways, of drug use
 progression, 69, 187. *See also* pathways
- THC (tetrahydrocannabinol): and
 dopamine neurons, 321; and
 reinforcement, 344, 348; and
 sensitization, 322–323. *See also*
 cannabinoids; marijuana
 tobacco. *See* cigarettes
- trajectories, and dependence, 29–35.
 See also developmental trajectories;
 pathways
 transdisciplinary approach: and animal
 models for drug use and abuse, 308;
 and policy issues for research on
 Gateway Hypothesis, 9–10
 transgenic mice, 307
 transition diagrams, and analysis of
 progression, 97–98
- unobserved population heterogeneity, 278
- van de Pol, F., 279
- Welte, J., 6
 Werch, C. E., 224
 White, H. R., 65
 Wiggins, L. M., 279
 Windle, M., 6
 withdrawal: and negative reinforcement,
 345–348, 352; and stress
 symptoms, 304
 Wohlwill, J. F., 19
 Wright standardized solution, 235
 Wugalter, S. E., 260
- Yamaguchi, K., 11, 21, 66, 69, 188, 194,
 224, 225, 271, 272, 273, 274–275, 276,
 277–284
- Zimmerman, M. A., 270